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DEPARTMENT OF THE ARMY FIELD MANUAL

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ENGINEER

INTELLIGENCE



HEADQUARTERS, DEPARTMENT OF THE ARMY
MAY 1959

FIELD MANUAL

No. 5-30

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., 12 May 1959

ENGINEER INTELLIGENCE

	Paragraphs	Page
PART ONE. NATURE OF ENGINEER INTELLIGENCE		
CHAPTER 1. INTRODUCTION-----	1-3	3
2. ENGINEER INTELLIGENCE: GENERAL.	4-8	4
PART TWO. RESPONSIBILITIES FOR ENGINEER INTELLIGENCE		
CHAPTER 3. ZONE OF INTERIOR-----	9-13	8
4. THEATER OF OPERATIONS-----	14-21	12
PART THREE. PRODUCTION OF ENGINEER INTELLIGENCE		
CHAPTER 5. GENERAL-----	22, 23	19
6. COLLECTION OF INFORMATION-----	24-33	20
7. PROCESSING OF INFORMATION-----	34-41	35
8. DISSEMINATION OF ENGINEER INTELLIGENCE.	42-47	41
9. DIRECTION OF THE COLLECTION EFFORT.	48-52	46
PART FOUR. PRODUCTS AND USES OF ENGINEER INTELLIGENCE		
CHAPTER 10. ENGINEER INTELLIGENCE PRODUCTS.	53-62	51
11. CATEGORIES OF ENGINEER INTELLIGENCE.	63-68	58
12. APPLICATIONS OF ENGINEER INTELLIGENCE.	69-76	60
PART FIVE. BASIC ELEMENTS OF ENGINEER INFORMATION		
CHAPTER 13. GENERAL-----	77, 78	66
14. NATURAL GEOGRAPHIC FEATURES----	79-88	67
15. LINES OF COMMUNICATION-----	89-96	72
16. OTHER CULTURAL FEATURES-----	97-104	80
17. INDUSTRIAL FACILITIES-----	105-111	88
18. MILITARY FACTORS-----	112-121	90

	Paragraphs	Page
PART SIX. ENGINEER INTELLIGENCE PERSONNEL AND TRAINING		
CHAPTER 19. ENGINEER INTELLIGENCE UNITS-----	122-125	99
20. OTHER ENGINEER INTELLIGENCE TRAINING.	126-128	105
APPENDIX I. REFERENCES-----		107
II. SAMPLE ENGINEER INTELLIGENCE PERIODIC REPORT.	-----	111
III. SAMPLE ENGINEER INTELLIGENCE ANNEX.	-----	112
IV. SAMPLE INTELLIGENCE REPORT ON ENEMY MATERIEL.	-----	115
V. ABBREVIATIONS-----		119
INDEX-----		120

PART ONE
NATURE OF ENGINEER INTELLIGENCE
CHAPTER 1
INTRODUCTION

1. Purpose

This manual is a guide for individual soldiers, commanders and their staffs at all levels, and special engineer intelligence units concerned with responsibility and procedures for the production and dissemination of engineer intelligence. It is to be used for both training and reference.

2. Scope

a. This manual defines engineer responsibilities and discusses the organizations and means that are available for the production, dissemination, and maintenance of all engineer intelligence. It provides guidance on the type of engineer information to collect the sources available, and the procedures used to collect and process the data. It discusses the utilization of engineer intelligence in strategic, tactical, and research and development planning. General intelligence techniques are only briefly discussed, since these are fully described in field manuals of the 30-series.

b. Sample lists of data required for such things as terrain, climate, field fortifications, structures, materials, utilities, water supply, cities and towns, and communications are given. Methods of reporting information and a list of abbreviations are also furnished.

c. The material presented herein is applicable without modification to both nuclear and nonnuclear warfare.

3. Relation to Other Manuals

Field manuals of the 30-series deal with intelligence techniques in general and also with those applicable to other arms and services and to special situations. FM's 100-5, 100-15, and 101-5 deal with the place of intelligence in general staff activities and in the planning and operations of large units. Field manuals of the 5-series which cover specific engineer troop units discuss the agencies within those units which have intelligence functions. Material included in the foregoing is dealt with in the present manual by cross-reference or brief summaries. For maps and mapping, see FM 5-6, FM 5-188, and TM 5-231.

CHAPTER 2

ENGINEER INTELLIGENCE: GENERAL

4. Engineer Information

Engineer information is data in any form (oral, written, or graphic) on—

a. The terrain, including the location, identity, and physical description of all natural, manmade, and military features on the surface of geographical regions, and including the effects of the terrain on operations and the effects of the weather on terrain.

b. Research and development of materiel and techniques corresponding to that materiel and those techniques for which the Corps of Engineers is responsible.

c. Design, manufacture (including the capabilities of agencies engaged in manufacture), mechanical functioning, military and civilian inventories, supply (including procurement, storage, and issue), and maintenance of materiel corresponding to the materiel for which the Corps of Engineers is responsible.

d. Employment of materiel, techniques, and organizations corresponding to that materiel and those techniques and organizations for which the Corps of Engineers is responsible.

e. The order of battle of engineer units and similar information on civilian organizations capable of performing engineer missions.

f. The identity and accomplishments of outstanding civilians in the fields of technology corresponding to those fields for which the Corps of Engineers is responsible.

5. Engineer Intelligence

Engineer intelligence is engineer information which, after collection, has been processed into intelligence by evaluating it as to accuracy and reliability, and interpreting it to determine its significance in the light of what is already known.

6. Scope of Engineer Intelligence

a. The scope of engineer intelligence is very comprehensive. In general it covers all fields of activity of the Corps of Engineers at all levels. (An important factor in this connection is the heavy demand which engineer construction and other tasks make on the

supply and transport agencies in a theater, and the resultant need to exploit local resources.) The wide variety of engineer intelligence data required for military operations is illustrated in parts four and five.

b. The nature of intelligence data required varies at different levels. Strategic intelligence normally pertains to theater army, theater, Department of the Army, and higher levels, and combat intelligence to army group and lower levels. However, no hard and fast line can be drawn, since the same item of engineer intelligence may be needed by engineers and others at all levels within a theater. For example, the existence, condition, capacity, rolling stock, and facilities of an axial railroad may affect the decision, at Department of Defense level, to operate in a certain theater. It will be an important element in the strategic and logistical planning at theater and theater army level. Data on its structural features will be needed by engineers at field and lines-of-communication levels, if extension, reconstruction, or large-scale demolition is called for. This information will also be needed by the commanders and staffs of any engineer brigades, groups, battalions, or other commands charged with such work, as well as by the Transportation Corps agencies which operate the railroad.

c. An important area of intelligence effort which will increasingly concern intelligence agencies, including those of the Corps of Engineers, is nuclear, biological, and chemical warfare. Engineers are interested in studies to evaluate the destructive effects of nuclear weapons on the natural terrain, aboveground and underground structures and installations, equipment, stored supplies, and personnel; and in the influence of terrain and weather on these effects. Of particular interest will be the ability of improvised or deliberately designed protective structures to withstand a nuclear explosion and to protect personnel from radiation; and the engineer part in recovery from the effects of a nuclear explosion. Engineer intelligence reports on such items as soils, atmospheric conditions, and various works of man, including roads, railroads, bridges, airfields, ports, utilities, urban areas, and military installations should always give consideration to the nuclear aspect of the subject under consideration. For details see part five.

7. Relation of Engineer Intelligence to Other Intelligence

a. As pointed out in paragraph 6, engineer intelligence covers the entire field of the activities and responsibilities of the Corps of Engineers. It is thus an organic part of Army intelligence, both strategic and combat.

b. Many items of engineer intelligence are of interest to other

arms, services, and agencies; and, similarly, many items of general combat intelligence are of interest to engineers. The normal means of exchange of such data is through intelligence channels. In addition there is usually direct exchange of information between engineer intelligence and other intelligence agencies, to include the technical and administrative services.

c. The fact that certain fields of information are of interest to two or more arms or services, perhaps from different points of view, can lead to duplication of activities, confusion, and friction unless proper precautions are taken. The axial railroad discussed in paragraph 6b is also a good example of a common field of interest. The Corps of Engineers is responsible for new construction and rehabilitation. The Transportation Corps exercises technical supervision over operation of the railroad and over repairs. Both agencies must have intelligence data on the railroad. In some cases, also, the required data will be identical. Thus, while rolling stock is of primary interest to the Transportation Corps, the Corps of Engineers must know its weight and other characteristics as an aid in determining the design load of bridges and culverts. Similarly, much of the structural data which the Corps of Engineers needs for rehabilitation work, the Transportation Corps also needs for routine maintenance and the stockage of repair parts. Therefore there must be coordination of intelligence work in such fields of common interest, with close cooperation of intelligence agencies at all levels and joint reconnaissance. Other examples of overlapping fields of interest are between the Corps of Engineers and the Ordnance Corps regarding enemy mines and demolitions, and between the Corps of Engineers and the Quartermaster Corps regarding facilities for the supply and distribution of petroleum products.

8. Relation of the Engineer to the Intelligence Officer

a. The commander is responsible for all intelligence activities of his command. The intelligence officer is responsible for the overall direction and coordination of intelligence activities according to the operation plan and the commander's policies. However, his field is staff responsibility. He does not exercise command.

b. In his relations with the staff engineer, the intelligence officer makes known to him the commander's needs for engineer information. He furnishes the engineer any engineer information which he may have obtained from other branches and services through intelligence channels. He integrates the information furnished by the engineer into his production of intelligence, and disseminates it through intelligence channels.

c. The engineer collects the information required by the commander, processes it into intelligence, and furnishes this to the intelligence officer for use and dissemination. He also disseminates engineer intelligence through technical channels to subordinate, adjacent, and higher headquarters.

d. In this, as in other fields, the engineer, in making use of technical channels, must see that it is done in accordance with the commander's policies, and that it never results in a failure to supply the intelligence officer with all data which the latter feels should pass through intelligence channels.

PART TWO
RESPONSIBILITIES FOR ENGINEER INTELLIGENCE
CHAPTER 3
ZONE OF INTERIOR

9. Chief of Engineers: General

a. The intelligence mission of the Chief of Engineers includes the production of intelligence for—

- (1) The Department of the Army and coordinate and higher agencies.
- (2) The Office, Chief of Engineers, and agencies under its control.
- (3) Army agencies at the level of the Chief of Engineers.
- (4) Commanders and staffs at the level below Department of the Army, supplementing engineer intelligence that they may receive from agencies under their command or from other sources.

b. In the specific field of mapping, the responsibilities of the Chief of Engineers include the preparation, reproduction, storage, and distribution of all types of maps, map manuscripts, grid tables, style sheets, and associated material, and also ground control and related data, including the ground-control support required for artillery and guided-missile fire. He provides standard designs and specifications for the foregoing, within the mapping policies of the Assistant Chief of Staff for Intelligence. He provides the final evaluation of mapping photography.

c. The intelligence organization under the Chief of Engineers is shown in outline in figure 1.

10. Intelligence Division, OCE

This is a division in the Office, Chief of Engineers, reporting to the Assistant Chief of Engineers for Troop Operations. It is essentially a policy making, planning, coordinating, and control staff. It has three components:

a. Security and Foreign Relations Section. This section formulates and enforces security policies and procedures for the Office, Chief of Engineers and field agencies under that office. It also

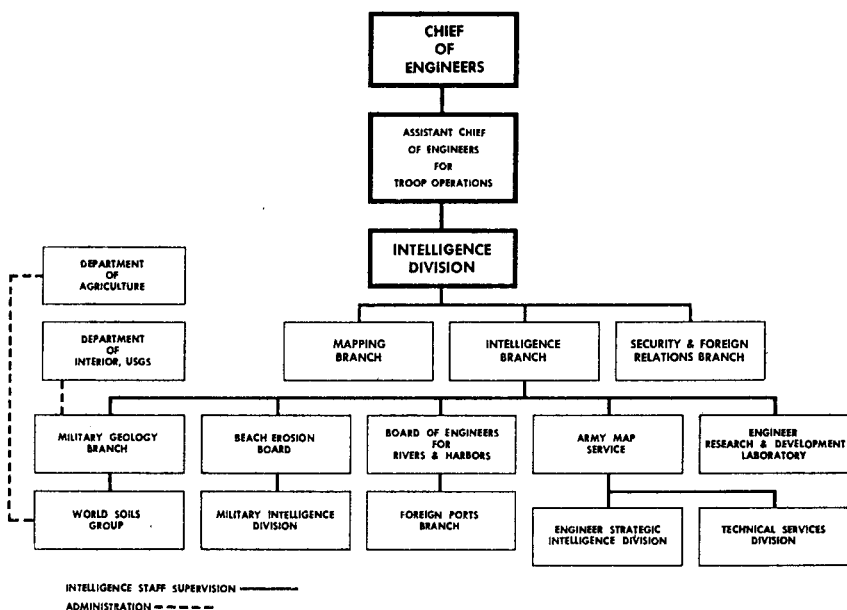


Figure 1. Intelligence organization of the Office, Chief of Engineers.

assists in arranging visits and tours for foreign military representatives and releasing data to them.

b. Mapping Branch. This branch initiates and directs, in accordance with the policies of the Assistance Chief of Staff for Intelligence, the mapping projects of the Army Map Service, assists in coordinating the mapping programs of the Army with those of other Federal mapping agencies, and assists in coordinating mapping operations and agreements relative thereto with foreign countries. Coordination is effected through the Department of Defense and its general staff.

c. Intelligence Branch. This branch initiates and supervises the program for the collection of engineer information and the production of engineer intelligence *other than* maps (but including intelligence appraisals of maps and charts). It is responsible for the operation and policy control of the nonmapping parts of the engineer intelligence program.

11. Intelligence Production Organizations of the Corps of Engineers

These include the following :

a. Army Map Service (AMS). The Army Map Service not only produces intelligence as indicated below, but is also the primary mapping agency of the Chief of Engineers. Its principal intelligence elements are:

- (1) The Technical Services Division, which provides the central engineer intelligence libraries, and produces intelligence for and on the production of maps.
- (2) The Engineer Strategic Intelligence Division (ESID), which is the principal engineer office in the Zone of Interior for the collection of engineer strategic information and the production of intelligence other than maps.

b. The Foreign Ports Branch, Statistical Division of the Board of Engineers for Rivers and Harbors. This organization produces intelligence on foreign ports and their facilities.

c. The Military Intelligence Division of the Beach Erosion Board. This office produces intelligence reports on coasts and landing beaches.

d. The Military Geology Branch of the U.S. Geological Survey. This is a bureau of the Department of the Interior which produces, for and at the expense of the Chief of Engineers, intelligence pertaining primarily to the natural features of the terrain and natural resources. They report on such basic subjects as soils, geology, vegetation, ground water, minerals, fuels, geophysical phenomena, and state of ground; and such interpretative subjects as concealment and cover, cross-country movement, construction materials, suitability for and problems of construction, prediction of suitable areas for airborne operations, effects of nuclear weapons on the terrain and water supply.

12. Relation of the Chief of Engineers to the Assistant Chief of Staff for Intelligence

a. The Assistant Chief of Staff for Intelligence establishes policies for the intelligence activities of the Chief of Engineers and supervises and coordinates their application.

b. All intelligence relations of the Chief of Engineers with agencies at and above Department of the Army level are through the Assistant Chief of Staff for Intelligence or in accordance with his policies.

13. Relation of the Chief of Engineers to Other Intelligence Agencies

a. It is evident from the above that the intelligence which the Chief of Engineers produces contains items of interest to a number of agencies at higher levels; including, among others, the Central Intelligence Agency, the Assistant Secretary of State for Intelligence, the Joint Intelligence Group, and the organizations to which they in turn supply intelligence. The types of material which are of interest to them are indicated in general terms by

their duties, and more precisely by directives or requests which they send out from time to time. Also these agencies, on their part, have access to data which is of value to the Chief of Engineers and should be incorporated into his body of intelligence. There is therefore a two-way flow of information and intelligence data, through prescribed channels.

b. The Office, Chief of Engineers also has intelligence contacts with other technical services of the Army in appropriate cases; for example, assisting the Transportation Corps, when requested, with special intelligence studies on ports and port construction.

CHAPTER 4

THEATER OF OPERATIONS

14. General

a. In any important future theater of operations there will probably be a unified command controlling the contingents of the Army, Navy, and Air Force operating in the theater. It is likely that the supreme commander will have a combined joint staff, including a J2, and that the engineers and other technical services will be represented either in the J staff sections or as separate staff sections. The theater army, theater navy, and theater air force commanders at the next lower level will each have a complete staff. In such a situation the senior staff section dealing in detail with engineer intelligence is the theater army engineer, operating under the direct staff supervision of the theater army G2.

b. Supervision by a theater J2 is general in character. It normally includes—

- (1) Indication to the services of the nature of the intelligence required at theater level.
- (2) Delineation of responsibilities for the collection of information by the three services.
- (3) Procedures for contact or liaison for the collection of information and exchange of intelligence between the three services at theater army, navy, and air force level; and between American and allied agencies.
- (4) Procedures for direct contact in intelligence matters at other levels; for example, between Army mapping or other engineer intelligence units and Air Force reconnaissance units.

15. Theater Army Engineer

a. The theater army engineer is responsible to the theater army commander, through the theater army G2, for engineer intelligence work at his level. This includes all engineer intelligence required at theater level by the theater commander and his joint staff. Due to the theater commander's territorial responsibilities and to the fact that his planning activities are long-term and extend over a large area, he requires a greater proportion of strategic intelligence, as compared with combat intelligence, than is the case at

field army and lower levels. The same is true, in a lesser degree, of the theater army commander. The theater army engineer is required to furnish terrain intelligence and other engineer intelligence to G2 and through G2 to the theater J2 to support such planning. Emphasis is especially on terrain intelligence, a very important type of engineer intelligence at that level.

b. He produces, and disseminates to lower echelons, engineer intelligence summaries and studies, including data on enemy materiel, engineering techniques and resources, and new engineering devices and methods. He maintains direct contact with the Chief of Engineers and exchanges intelligence data with that office.

c. He exercises technical supervision over the intelligence activities of subordinate engineer staffs and headquarters.

d. He is assisted by such engineer intelligence units as may be assigned to direct theater army control. Normally these include one or more teams IG, engineer technical intelligence (collection); teams IH, engineer technical intelligence (research); and teams IK, engineer terrain (par. 20). For composition of teams, see TOE 5-500. They may also include any or all of the engineer base topographic battalions and companies in the theater, together with teams needed to augment those units. Such troop assignments will be based on the situation, and may vary from time to time.

e. In the field of mapping the theater army engineer is responsible for—

- (1) The execution of mapping directed by higher authority.
- (2) The development of a mapping program to meet theater requirements.
- (3) Determination of requirements and priorities, under supervision of G2, for the production and supply of maps; formulation of plans and policies governing mapping operations; and coordination of the theater mapping effort, including liaison with the mapping agencies of any allied forces.

f. The theater army engineer deals with various agencies in obtaining or exchanging engineer intelligence data. In addition to G2 and other staff officers at theater headquarters, they include—

- (1) Engineers of subordinate headquarters, especially field armies, communications zone (CommZ), and special task forces, through engineer technical channels.
- (2) Navy and Air Force agencies under the theater navy and theater air force commanders. Contact may be direct, through liaison officers, or through formal channels, as may be prescribed by theater J2 and theater army G2.

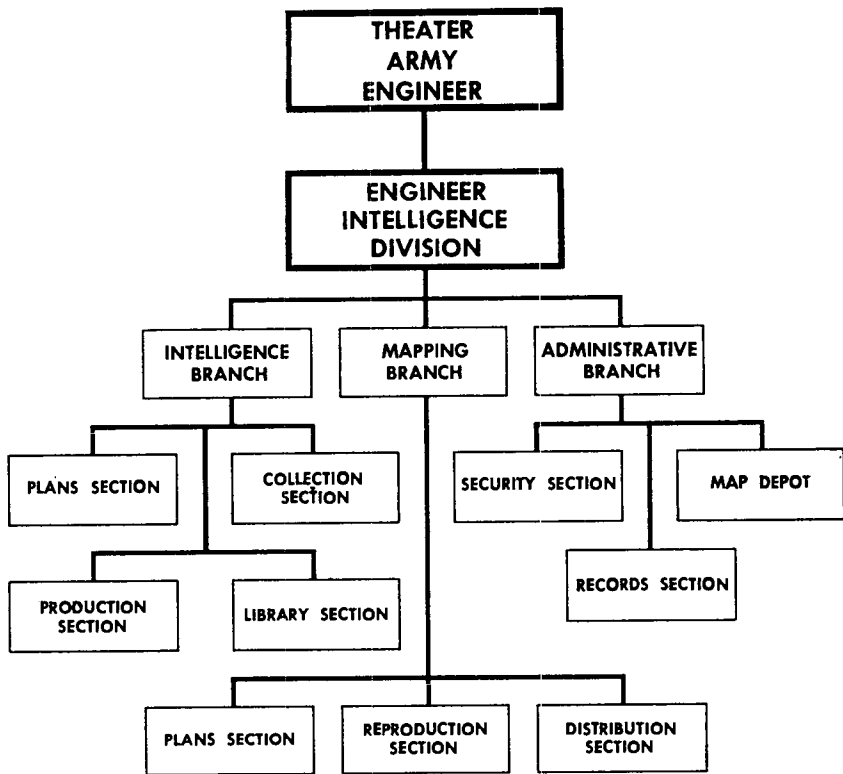


Figure 2. Possible organization of the engineer intelligence division at theater army.

- (3) Allies with whom there is contact at theater or theater army level. Contact may be with a coordinate headquarters of the allied armed forces or with the war office or equivalent at the allied capital. The channels for such contacts are prescribed by the theater commander or higher authority and are rigidly adhered to.

g. The foregoing duties are performed, under the theater army engineer's direction, by the intelligence division of his office. There is no prescribed organization for this agency, which varies with the nature, size, and characteristics of the theater and the forces engaged. However, a suggested basic organization is illustrated in figure 2.

16. Army Engineer

a. Field army and lower levels are concerned with limited areas of a theater. The engineer intelligence required is therefore, in the average case, more detailed and more localized than at the

theater army level, and is increasingly concerned, as one proceeds downward in the chain of command, with the current situation as developed by recent reconnaissances. This is especially true in a fast-moving situation.

b. The army engineer collects engineer information, processes it into engineer intelligence, and disseminates it through both intelligence and technical (engineer) channels, upward to army group and theater army engineers, back to the communications zone engineer, down to subordinate headquarters, and laterally to adjacent field armies. He prepares and distributes engineer intelligence memoranda, notes, and special reports on matters of interest within the army, especially materiel needed on short notice, supplementing that prepared by the theater army engineer. He supervises all engineer intelligence activities within the army. He handles mapping and map distribution throughout the army, under G2 policies.

c. The army engineer's office has a large intelligence subsection which includes a mapping and intelligence officer, an engineer intelligence assistant, a terrain intelligence officer, and a photomapping specialist. The army engineer is also assigned such other engineer intelligence units as are assigned to direct army control. Normally these include units of the following categories: engineer topographic battalion, map depot platoon, and teams IH, IK, and (if appropriate) IJ and IL (par. 20). Assignment of teams is not rigid, and both the type and the number are varied as necessary. With the authorization of the army commander, the army engineer may exercise operational control over these troop units (as with other engineer units assigned to that army).

17. Corps Engineer

The corps engineer has more limited intelligence responsibilities than the army engineer. He does, however, have the duty of preparing maps and topographic information, including surveys, in support of corps operations, supplementing those received from army; and of distributing maps within the corps. He is normally assisted by an engineer topographic company, corps and a technical intelligence (collection) team (IG), and often by an engineer terrain team (IK). The IG teams of the various corps of a field army work closely with the army IH team, and the corps topographic company may call on the army topographic battalion for assistance.

18. Division Engineer

a. The division engineer is both a division staff officer and the commander of the divisional engineer battalion. He is charged

with furnishing engineer intelligence to the entire division. The items with which he is especially concerned include local maps and sketches, terrain, routes of communications, sources of usable engineer supplies and equipment, and enemy structures, minefields, obstacles, and engineer troops and installations.

b. The division engineer relies to a considerable extent on intelligence furnished by higher headquarters through technical channels. However, he has definite responsibilities for the collection and processing of engineer information within the divisional zone or sector. He is assisted in the execution of his responsibilities by the engineer battalion intelligence section, the component companies of the engineer battalion, and other divisional troops, especially combat troops. For information on these agencies, see chapter 6.

c. The battalion intelligence section consists of an intelligence officer (S2), reconnaissance officers, an intelligence sergeant, engineer reconnaissance sergeants, a clerk typist, a draftsman, radio operators, a map distributor, and a still photographer. Since the S2 of the divisional engineer battalion is responsible for providing the division staff as well as the battalion with necessary engineer intelligence, it is desirable from an intelligence standpoint to locate battalion headquarters as near as practicable to division headquarters.

d. The Engineer Technical Intelligence Detachment (collection) at corps makes frequent personal visits to the S2 section of the divisional engineer battalion to collect data on the location of items of enemy engineer materiel discovered in the division area.

e. The foregoing applies to the division engineers of infantry, armored, and airborne divisions, with such variations as the specialized activities and organizations of those units require.

19. Engineer Topographic Units

For data on these units and on their functions as engineer information collection agencies, see FM 5-188.

20. Engineer Intelligence Teams IG, IH, and IK

a. *Team IG, Technical Intelligence, Collection (TOE 5-500C).* This team is often referred to as ETID(C) (engineer technical intelligence detachment, collection). It is concerned with finding, collecting, identifying, photographing, and reporting on items of engineer technical intelligence, such as foreign engineer equipment, construction, organization, training, tactics, techniques, and fortifications and other installations. It also has the capability of illustrating and preparing training aids and instructing in the use

or counteraction of enemy materiel. However, it deals more with the collection of information than with detailed processing and the research involved therein. Its personnel include specialists in enemy equipment and utilities, equipment identification, and combat engineering. In a theater of operations, teams are normally assigned one per corps, and to higher echelons as required. If proper direction is furnished, they may also be assigned, in both peace and war, to the Zone of Interior, and to allied and other friendly nations with the knowledge and permission of such nations. In a theater of operations the team works closely with intelligence staffs and units in its area and must count on them for assistance, especially in the collection of enemy materiel, documents, and so on. It also works closely with the ETID(R) at and below field army level.

b. Team IH Technical Intelligence, Research (TOE 5-500C). This team is often referred to as ETID(R) (Engineer technical intelligence detachment, research). Its field of interest is the same as that of ETID(C), but it deals primarily with research, processing, and reporting, leaving field collection to ETID(C)'s and other cooperating agencies. It assists in the interrogation of enemy military and civilian personnel for engineer intelligence. It coordinates the activities of the ETID(C)'s within its area. In a theater, normal assignment is 1 per field army; teams may also be assigned to the Zone of Interior or to duty in foreign countries, as in the case of ETID(C)'s. The personnel of the team include specialists in enemy equipment and utilities, equipment identification, and combat engineering.

c. Team IK, Terrain (TOE 5-500C). This team is often referred to as ETD (engineer terrain detachment). It is concerned with the analysis of geographical areas to determine the effect of natural and manmade features on military operations. It provides technically qualified personnel for the collection, evaluation, and dissemination of terrain data and for the production of terrain studies. The team also provides consultant services in military geology and hydrology. The personnel of the team include specialists in terrain analysis and intelligence, geology, hydraulics, utilities, highways, and soil. Normal assignments are to theater army, army group, and field army. However, assignments of teams to corps will usually also be required to prepare operational terrain studies for corps use.

21. Other Units

a. Engineer Combat Battalion, Army (TOE 5-35D). This unit has substantially the same intelligence organization as has a divisional combat battalion. It produces engineer intelligence for its

own use and for transmission to group headquarters as far as its limited facilities allow, and receives intelligence through technical and command channels.

b. *Engineer Combat Group (TOE 5-192C)*. This unit is normally assigned to army or corps. Among its components are army combat battalions. It coordinates the intelligence which it receives from subordinate units and from army or corps headquarters and disseminates the product through technical channels. It also collects intelligence as far as its limited facilities permit. Neither the group nor its component battalions have the specific duty of furnishing intelligence to army; but the army engineer's intelligence section maintains liaison with the group S2, who furnishes such intelligence as is at his disposal.

c. *Other*. For details of the intelligence activities of the foregoing and other engineer TOE units, see the FM 5-series manuals dealing with those units. For troops other than engineer, see chapter 6.

PART THREE
PRODUCTION OF ENGINEER INTELLIGENCE
CHAPTER 5
GENERAL

22. Agencies

All engineer agencies and personnel in a theater have a part in the production of engineer intelligence, at least to the extent of collecting the information on which it is based. Every officer and enlisted man is a link in the intelligence chain, and should be trained to recognize, collect, and turn in pertinent data in connection with his normal tasks. The processing of such information, however, is principally by specialists.

23. The Intelligence Cycle

Production of intelligence involves four steps: the collection of information, its processing, its dissemination and use, and the direction of the collection effort. Since intelligence may be useless or even dangerous unless kept up to date, its production and revision must be continuous. Accordingly, the four processes are going on simultaneously at all levels and in all agencies concerned. This concurrent and continuing activity is known as the *intelligence cycle*. For further details of the cycle as such, see FM 30-5.

CHAPTER 6

COLLECTION OF INFORMATION

24. Sources of Information in the Department of the Army

a. As explained in chapter 3, the Department of the Army and the Chief of Engineers have access to a large volume of information on foreign nations, their population, terrain, weather, natural resources, actual and potential production of raw materials and goods, means of transport, domestic and foreign policies, and the like, and also on the personalities of important individuals.

b. This information is constantly being processed by the Chief of Engineers and filed for reference or disseminated. The documents thus produced become intelligence sources for other agencies, including theater and theater army commanders in time of war. The more important documents are listed in chapter 10.

c. When material from lower sources is digested in this way at a high level, for dissemination downward, it is important to state in the text the sources of all statements contained therein. Otherwise there is the danger of "false confirmation"; that is, of a document, which is in fact based on another document, being taken as an independent confirmation of the other document.

25. Sources of Information in a Theater

a. In general terms, engineer information in a theater is obtained in three ways: by the study of documents, to include the interpretation of photographs; by reconnaissance agencies; and by interrogation of individuals. More specifically the sources are as listed below. Of those listed, photographs will probably be the primary source of engineer information.

- (1) Aerial and ground reconnaissance.
- (2) Aerial and ground photographs.
- (3) Maps.
- (4) Prisoners of war.
- (5) Refugees.
- (6) Local civilians.
- (7) Captured enemy material.
- (8) Captured enemy installations.
- (9) Captured enemy documents.

(10) Other documents, including texts, periodicals, and technical papers.

(11) Intelligence publications (including those listed in ch. 10).

b. These sources are available to, and used by, the engineers of commands at all levels, but in varying proportions. At theater level the engineer deals primarily with sources of information concerning the overall theater picture, such as DA intelligence publications and data, air reconnaissance reports and photos of the enemy's rear areas and zone of interior, captured documents of major importance, and senior officer prisoners of war. At field army and lower echelons the engineers are concerned with sources which yield more immediate, detailed, and local information. At divisional level, ground and short-range aerial reconnaissance and reports from other frontline troops, supplemented by data from local intelligence sources such as prisoner-of-war statements, are of vital importance in bringing up to date the available intelligence on terrain and enemy installations. In a fast-moving situation they may be the only sources of such intelligence.

26. Collection Agencies in a Theater

Agencies for collecting engineer information include engineer troops and teams, other troops, intelligence personnel, and the Air Weather Service.

a. *Engineer Troops and Teams.* Their intelligence responsibilities and capabilities were summarized in paragraphs 15 to 20.

b. *Other Troops.* Other troops, especially divisional combat troops, have access to a great deal of engineer information. It eventually comes to the engineers through intelligence channels. However, the staff engineer's intelligence officer, with G2's permission, normally establishes informal liaison with such units, whereby the volume, accuracy, pertinence, and speed of transmission of the desired information are increased. In an infantry division the key personnel with whom liaison is established are the S2's of the battle groups, cavalry squadron, armor battalion, aviation company, division artillery, and transportation battalion. Types of information to be expected include data on enemy obstacles; fortifications; roads and bridges; streams; and engineer equipment and supplies, including construction materials. By effective liaison it can sometimes be arranged to have infantry or other reconnaissance parties, in the course of their regular duties, collect important engineer information which they might normally overlook. On occasion, engineer personnel may accompany such parties. Military police are a valuable source of information.

c. *Military Intelligence Specialists.* The intelligence officer, in addition to coordinating the production of intelligence within the command, has intelligence specialists who are capable of exploiting particular sources of information. Those of most interest to engineers are interrogators of prisoners of war (IPW) sections, interpreter/translator sections, photo-interpreter (PI) sections, document sections, order of battle (OB) sections, and field operations intelligence (FOI) units.

- (1) IPW sections interrogate prisoners of war, interned enemy civilians, and refugees, in their own languages, and analyze captured documents for information of immediate intelligence interest.
- (2) Interpreter/translator sections interpret and translate foreign languages and documents for commanders and their staffs in dealing with military and civilian personnel of allied and other friendly nations.
- (3) PI teams interpret aerial photography to obtain information regarding terrain, culture, and military activity.
- (4) Document sections translate captured documents.
- (5) OB sections collect and analyze information on the enemy forces, including organization, strength, equipment, tactical doctrine, command personalities, and dispositions.
- (6) For FOI units, see AR 381-104.

d. *The Air Weather Service.* This branch of the Air Force supplies climatic data and weather forecasts to the Army. Air Weather Service detachments at corps and field army headquarters are the agencies responsible for performing this mission.

27. Ground Reconnaissance

a. *General.*

- (1) Reconnaissance should be preceded by a review of available pertinent intelligence.
- (2) Any reconnaissance on which engineer work is to be based should be made far enough in advance to permit planning the work and starting it on schedule.
- (3) Incomplete but timely information is useful, whereas a complete report received too late to be acted upon is worthless.
- (4) Reconnaissance must be repeated as often as is necessary to keep the information up to date. In fast-moving situations and in combat it may be continuous.
- (5) Aerial reconnaissance often, but not always, precedes ground reconnaissance.

b. Responsibility. Every staff engineer and engineer commander is responsible for the reconnaissance needed by his command. He normally delegates to his intelligence officer the planning and direction of the work.

c. Types. Engineer reconnaissance may be *general* (to secure information of a general character) or *special* (to secure information bearing on a specific task or situation). General reconnaissance normally precedes any special reconnaissance.

d. Echelons. From front to rear, these are—

- (1) Engineer aerial reconnaissance.
- (2) Advanced ground reconnaissance, by engineer personnel with advance or covering forces.
- (3) Division area reconnaissance, by divisional engineer troops.
- (4) Rear area reconnaissance, as directed by corps, army, and lines-of-communication engineers.

e. Planning. The officer ordering the reconnaissance prepares orders setting forth the mission of the reconnaissance party. The order includes a statement of where the area to be reconnoitered is located; what data are desired, in what detail, and in what order of importance; when, where, and to whom the chief of party is to make his report; and any other required instructions. The officer responsible for conducting the reconnaissance decides on the general route, taking into consideration enemy observation and interference; prepares a time schedule; and selects the necessary equipment and qualified personnel. The reconnaissance plan must be coordinated with the supported unit which has area responsibility. Figure 3 shows a typical order for ground reconnaissance on a prepared format, issued by the headquarters of an engineer combat battalion to one of its companies.

f. Conduct.

- (1) *Observing.* Attention to detail is important. Quantities, sizes, and other data expressible in numbers should be counted, measured, or estimated.
- (2) *Recording.* Data should be recorded at once, by notes, sketches, or the use of prepared forms. Photographs are a valuable supplement to a reconnaissance. Figure 4 (DA Form 1711-R) shows a typical report of an engineer ground reconnaissance party. Figure 5 shows a typical bridge reconnaissance report, prepared as an annex to the main report.
- (3) *Scheduling.* Adherence to schedule by the reconnaissance party is necessary, to avoid either going too fast and

RECONNAISSANCE INSTRUCTIONS

No. 3

1ST ENGR BN
(Organization)

To: CO Co B 1ST ENGR BN Effective 070800 OCT 50
(Hour and Date)

Maps: L-751 KOREA, 6528 IV, 1:50,000

Complete report to: S2 1ST ENGR BN at 081600 OCT 50
(Organization & Location) (Hour and Date)

Reconnoiter and report information as indicated below by items checked (✓). Report also any other information of technical importance incidentally secured	DETAILED INSTRUCTIONS Areas, special features or structures, special reports, and work estimates required
✓1. ROADS: classify using symbols.	
✓2. BRIDGES, FORDS, and FERRIES: classify using symbols, include hasty demolition requirements. Possible by-pass for existing crossings.	a. Conduct reconnaissance in Co B's area of responsibility.
3. OBSTACLES to our movement, natural and artificial, include demolitions, mines, booby traps.	b. Select sites for battle group WP's. Coordinate with battle group S4's.
4. TERRAIN: general nature, ridge system, drainage system, including fordability, forests, swamps, areas suitable for mechanized operations.	c. Prepare report on items checked using engr recon report and work estimate form.
✓5. ENGR MATERIALS: particularly road material, bridge timbers, lumber, steel, explosives.	
✓6. ENGR EQUIPMENT: particularly rock-crushers, saw-mills, garages, machine shops, blacksmith shops.	
7. ERRORS and OMISSIONS on MAPS USED.	
8. BARRIERS to enemy movement: natural, artificial, and sites for construction or improvement.	
✓9. WATER POINTS: recommended locations.	
10. STREAMS: general description, width, depth, banks, approaches, character of bottom and means to be used at possible crossing sites. Navigability?	
11. DEFENSIVE POSITIONS.	
12. BIVOUAC AREAS: entrances, soil, drainage, sanitation, concealment.	
13. PETROLEUM STORAGE and EQUIPMENT.	
14. UTILITIES: water, sewage, electricity, gas.	
15. PORTS: wharves, sunken obstacles, cargo handling facilities, storage facilities, transportation routes.	
16. CONSTRUCTION SITES: drainage, water supply, power source, earthwork, access, acreage, soil.	
17. ATOMIC or DEFILADE POSITIONS.	

FOR THE COMMANDER:

John Jones
John Jones

MAJOR 1ST ENGR BN

S3

Figure 3. Typical format for engineer ground reconnaissance instructions.

ENGINEER RECONNAISSANCE REPORT (TM 5-295)					PAGE 1 OF 1 PAGES	
TO: CO, 65 th ENGR BN			FROM: CO, CO B, 65 th ENGR BN			
FILE NO. 236		PARTY LEADER (Name, Grade, Organization) GREATHOUSE, M/SGT, CO B			PLACE - HOUR - DATE BT 906357	
REPORT NO. 3		65 th ENGR BN			071700 OCT 50	
MAPS L 751, KOREA 6258 IV SCALE 1:50,000						
DELIVER TO (Organization, Place, Hour, and Date) S2, 65 th ENGR BN NOLTARI BT840833 081100 OCT 50						
KEY	OBJECT	TIME OBSERVED	WORK ESTIMATE?	ADDITIONAL REMARKS AND SKETCH		
1	SAWMILL	0710	NO	LOCATION - 907358 - SAWMILL IN OPERATING CONDITION. MAIN UNIT, UPPER SAW 60", DRIVEN BY 100 HP DIESEL MOTOR, CAPACITY 2,500 FT/HR. GANG EDGER DRIVEN BY 15 HP GAS-OLINE MOTOR, CAPACITY 1,500 FT/HR. CUT LUMBER - 100 PCS 6"x12"x20', 150 PCS 12"x12"x20'.		
2	BRIDGE	0750	YES	SEE BRIDGE RECONNAISSANCE FORM (ANNEX) LOCATION - 907360		
3	W.	0835	YES	LOCATION - 908325 QUANTITY - A = 25 SQ FT V = 30 FPM Q = 4781.25 GAL/MIN QUALITY - SLIGHT TURBIDITY NO ODOR POSSIBLE POLLUTION, NEARBY FARMS COMMUNICATIONS - GOOD ROADS TO MSR. SITE CONDITIONS - GOOD CONCEALMENT. FARM HOUSE POSSIBLE ARTILLERY TARGET. LOCATED IN DEFILADE. GOOD DRAINAGE, SOLID BANKS. RATING - EXCELLENT WP FOR BG		
TYPE NAME, GRADE AND ORGANIZATION H. E. GREATHOUSE M/SGT, CO B, 65 th ENGR BN				ENGINEER WORK ESTIMATE ON OTHER SIDE SIGNATURE <i>H. E. Greathouse</i>		

Figure 4. Typical report of an engineer ground reconnaissance party.

missing important items, or going too slow and either missing the deadline for the report or omitting part of the reconnaissance. The use of control points, at which the party must arrive by predetermined times, is often valuable.

- (4) *Combat.* The party should not engage in combat unless it must fight to accomplish its mission or fight in self-

ENGINEER WORK ESTIMATE									
LOCATION KEY	DESCRIPTION OF WORK	UNIT REQ'D	HOURS	EQUIPMENT		HOURS	Type	MATERIALS	
				Type	No.			Unit	Quantity
②	REINFORCE BRIDGE.		SEE	BRIDGE RECONSTRUCTION (ANNEX 1 TO THIS REPORT)			REPORT.		
③	CONSTRUCT ENTRANCE ROAD TO WATER POINT. CAMOUFLAGE WATER POINT.	1 SQUAD	8 HOURS	D-7 DOZER DUMP TRUCK	1 1	2 8	GRAVEL CAMOUFLAGE	YDS.	20
				SQUAD PIONEER SET	1	8	NETS AND CAMOUFLAGE (36,744')	EA.	3
RECONNAISSANCE REPORT ON OTHER SIDE									

Figure 4—Continued.

BRIDGE RECONNAISSANCE REPORT (FM 5-36)						DATE 7 Oct 50	
TO: (Headquarters ordering reconnaissance) S2 1st Engr Bn Noltari BT84833				FROM: (Name, grade and unit of reconnaissance officer) Starobin, 1st Lt Co B			
1. ROUTE OR LINE HIGHWAY X RAILROAD		2. FROM (Initial Point) IWON		3. TO (Terminal Point) Yanngu		4. DATE/TIME GROUP (Of signature) 071700 Oct 50	
5. MAP SERIES NR L751Korea		6. SHEET NR 6258 IV		7. GRID REFERENCE TYPE UMGRS COORDINATES 962980		8. BRIDGE NUMBER 2	
9. CLASS		10. LOCATION FROM NEAREST TOWN DISTANCE 2 Mi DIRECTION East NAME OF TOWN Chipyong-ni					
						11. CROSSING (Name of geographical feature) Sibyongni River	
SECTION I - GENERAL RECONNAISSANCE							
12. TEMPORARY CLASS 10		13. ROADWAY WIDTH 20'		14. OVERHEAD CLEARANCE Deck type		15. CONDITION ☐ EXCELLENT ☒ GOOD ☐ FAIR ☐ POOR	
16. TOTAL LENGTH 40'		17. BYPASS INFORMATION Bypass easy					
SECTION II - DETAILED RECONNAISSANCE							
18. PRINCIPAL DIMENSIONS				19. SITE FEATURES			
a. SPANS (Check one) ☒ SIMPLE ☐ CONTINUOUS ☐ CANTILEVER		MATERIAL AND TYPE Stringers 8" I-Beam Floor 3-12plank Deck 3-12plank		NR 10 40 80 TOTAL 1,800'		LENGTH 200' 800' 800'	
b. INTERMEDIATE SUPPORTS (Piers)		Concrete		1		c. STREAM PRES. 20' HW 26' D. BOTTOM (Material) Firm gravel	
c. ABUTMENTS		Concrete		e. BANKS (Looking) West		f. LEFT 2'	
d. UNDER BRIDGE HEIGHT		Concrete		g. RIGHT 2'		h. (1) HEIGHT 4:1	
20. APPROACHES		6'		4'		(2) SLOPE 4:1	
Good condition				(3) MATERIAL Firm gravelly Firm gravelly			
21. REMARKS Reinforce to class 20 Place bents as shown on back of this form							
22. ESTIMATE OF REPAIR AND/OR DEMOLITION							
Equipment:				Materials:			
1-Air compressor - 4 Hrs.				Timber 4 - 12 x 2 x 20'			
				8 - 6 x 12 x 6'			
Labor:				8 - 3 x 12 x 3'			
1-Squad - 4 Hrs.				4 - 2 x 2 x 21'			
Drift pins 16 - 12" x 5/8"							

DA FORM 1249
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Figure 5. Typical report on reconnaissance of a bridge (annex 1 to fig. 4).

defense. Under most conditions it must take special precautions to avoid being seen by the enemy.

g. *Other Aspects.* For further details on the planning and conduct of ground reconnaissance, see FM 5-6, FM 21-75, and FM 30-5.

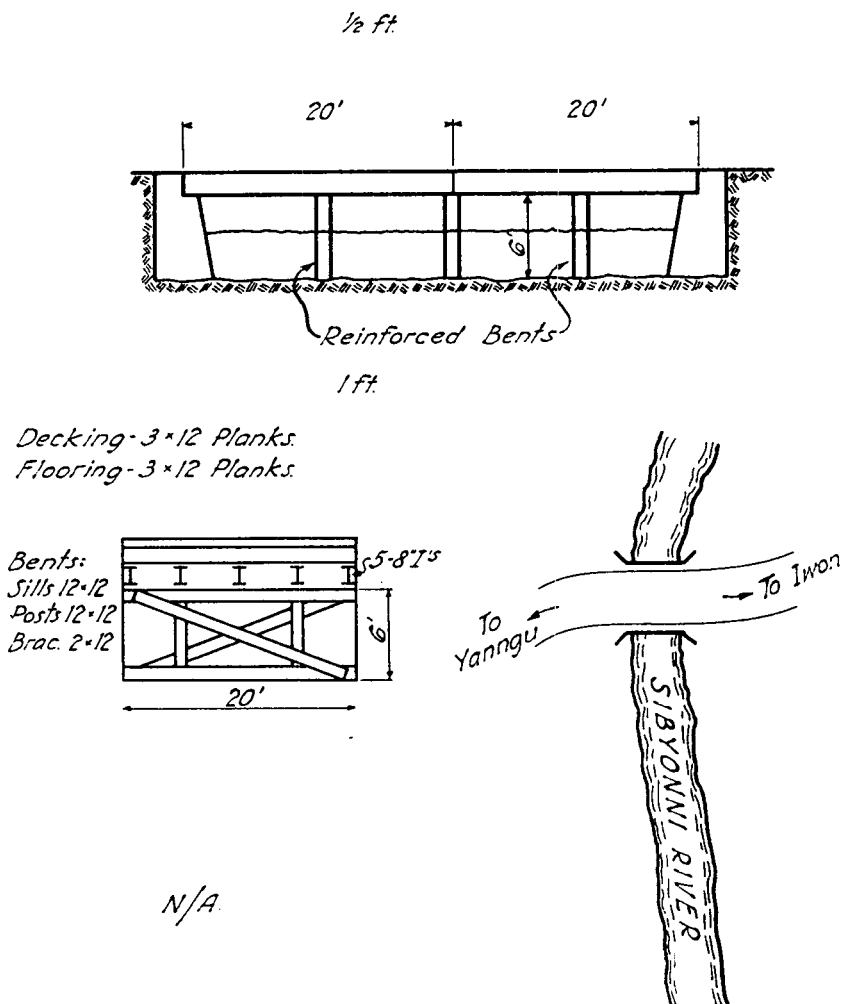


Figure 5—Continued.

28. Aerial Reconnaissance

a. *General.* The basic principles governing aerial reconnaissance are the same as for ground reconnaissance. The two supplement each other and are most effective when they can be parts of a coordinated information collection plan; although either one may be, and often is, used independently. Aerial reconnaissance gives rapid coverage, a more or less simultaneous picture of a large area, and a view of areas which are inaccessible to ground observers. It cannot be carried out in extreme weather conditions. Visual aerial reconnaissance is also affected by poor visibility and by the limitations of the human eye and brain in accurately observing and re-

cording what is seen. These limitations can be largely overcome by aerial photography. Aerial reconnaissance cannot give the detail provided by ground reconnaissance. Certain matters of interest, such as the interiors of structures and the objects concealed by adequate natural cover or camouflage, are beyond the capability of aerial observation.

b. Categories. With respect to technique, aerial reconnaissance missions are typed according to the sensing equipment used; photographic, electronic, and weather. With respect to areas studied, there are five types of visual aerial reconnaissance—area search, specific search, route reconnaissance, contact reconnaissance, and artillery adjustment. Engineer aerial reconnaissance is limited to the first three.

- (1) *Area search.* This corresponds to general ground reconnaissance and is concerned with all items of engineer interest in a given area. It is most successful in territory which is not heavily wooded or extremely precipitous.
- (2) *Specific search.* This corresponds to special ground reconnaissance and is intended to develop information on some particular installation, activity, or category of interest.
- (3) *Engineer route reconnaissance.* This deals with roads, railroads, and waterways, including especially the facilities, installations, and equipment concerned with transportation, but embracing also any other relevant items along the route.

c. Facilities.

- (1) The following engineer units have organic reconnaissance aircraft:
 - Engineer combat group.
 - Engineer combat battalion, army.
 - Engineer topographic battalion, army.
 - Engineer base topographic battalion.
 - Engineer topographic group.
 - Engineer base survey company.
- (2) Supplementing the results of organic aircraft reconnaissance, engineers receive, through army, corps, and divisional G2, information obtained by army aviation units and the Air Force, in the form of periodic intelligence reports, special messages, photos, and photomaps. Staff engineers, especially at higher headquarters, may arrange for special long-distance reconnaissance missions using Air Force planes.

d. Conduct of Visual Reconnaissance. Engineer visual aerial reconnaissance with organic equipment is performed by trained engineer pilots and observers. The training of an adequate number of observers is the responsibility of the unit Intelligence Officer. Initial reconnaissance of an area, to obtain general data on terrain, routes of communications, and other matters of engineer interest, is usually by the engineer Intelligence Officer. It is the basis upon which he plans specific search missions and route reconnaissance missions, and it may also be the basis for his ground reconnaissance planning. Aerial reconnaissance, especially of areas not visible to ground observers, must be repeated periodically to detect any changes in the situation.

29. Aerial Photography and Photo Interpretation

a. General. Aerial photography may be undertaken to produce either single photographs (vertical or oblique), controlled mosaics, or maps. For the techniques of aerial photography and photomapping, see TM 5-240, TM 5-244, TB 5-240-2, and TB SIG 229. For photo interpretation, see TM 30-245 and TM 30-246. The mapping aspects of aerial photography will not be considered here.

b. Capabilities and Limitations. For reconnaissance purposes, and as compared with visual observation, aerial photos have the great advantage that they are mechanically accurate except for optical distortions; that they can be studied by experts using magnifying and stereographic devices; and that, given special equipment, they can be taken at night or through clouds or fog. A single aerial photo does not show whether an object is in motion unless there are visual indications of the motion, such as the bow waves of a ship or dust clouds along a road. (This statement does not apply to overlapping aerial photos viewed stereoscopically, which will reveal distance and direction of movement of objects.) Also, aerial photos must be flown back to the base, developed, and delivered before the information is available. These limitations can be partly overcome if an Army observer accompanies the mission.

c. Coverage. The term "aerial photo coverage" denotes ground area as presented on aerial photos, photomaps, and mosaics. Aerial photography for other than mapping purposes, obtained by tactical aerial reconnaissance, has three categories of coverage:

- (1) *Initial cover.* This is obtained to produce information on terrain, trafficability, and other features of interest to engineer intelligence agencies, to a depth of 300 miles or more into enemy territory. It is normally planned at field army level, but may be assigned by army to corps or division for execution. In a stable situation it may be

flown only seasonally. Photographs should be such as to permit stereoscopic study.

- (2) *General intelligence record*. This is obtained to determine current enemy dispositions, troop movements, and mobile or transient installations. It may be flown daily or as needed. It usually extends to a depth of 10 to 15 miles into enemy territory, with necessary coverage of the flanks.
- (3) *Detailed intelligence record*. This is obtained to acquire data on specific objects or objectives. With respect to areas covered, it includes block cover, pinpoint (or spot) cover, and route (or strip) cover.

d. Sources of Aerial Photos. Staff engineers and engineer commanders may obtain aerial photos, for other than mapping purposes, from the following sources:

- (1) Photography taken from assigned aircraft. Although these aircraft do not have built-in cameras, trained Army aerial photographers can produce good quality photographs with stereoscopic capability.
- (2) Duplicate prints from the photo-interpretation teams of the intelligence officer, which obtain such photographs from various sources, including organic aircraft of the command and the intelligence officers of higher commands.
- (3) Air Force photos which may be made specifically for the engineer, based on a request through the channels prescribed by the theater commander or by G2.

e. Photo-Interpretation.

- (1) The primary agency of photo-interpretation in a command is the photo-intelligence section of the intelligence officer. In a field army, interpretation functions may be largely concentrated in army G2 or under his immediate supervision. Photos which a staff engineer obtains from G2 are likely to have been processed and pertinent data posted on a map or otherwise recorded.
- (2) No engineer TOE unit has a photo-intelligence section as such. Map compilers and others in engineer topographic units often develop skill in reading aerial photos.
- (3) Some of the information which enters into engineer intelligence (for example, certain hydrologic and topographic data) can be obtained from aerial photos without skilled interpretation. The staff engineer can often arrange with the intelligence officer to obtain duplicate

prints of aerial photography for examination by engineer units.

30. Collection by Interrogation

a. General. This is not in general an engineer function, except for information obtained by direct contact at the operating level with individuals of friendly populations. Items of information thus obtained should be carefully identified as to source and should normally be reported to the intelligence officer. Engineer personnel often assist intelligence agencies in interrogating enemy personnel.

b. Civilian Populations. Civilian populations in a theater, especially in the combat zone and in the vicinity of key installations, are screened for security purposes. Screening is more rigorous with hostile than with friendly populations. Refugees are carefully screened. Such screening and interrogation of key individuals, such as local officials and technical specialists, is the staff responsibility of the unit intelligence officer, who may utilize Counter Intelligence Corps (CIC) personnel, assisted by military intelligence interpreters and interrogators, in coordination with civil affairs/military government (CAMG) units and military police. Evadees and escapees claiming to be nationals of the United States or any of its allies, whether civilians or members of the armed forces, are evacuated to army headquarters and interviewed by specially selected personnel. In all the above cases it is the responsibility of engineer intelligence officers to see that the interrogating agencies are informed, through intelligence channels, of the kind of information which the engineers desire from such sources.

c. Prisoners of War. The processing of prisoners of war from capture to ultimate destination is set forth in detail in FM 30-15.

31. Collection From Enemy Documents

a. Definition. From the intelligence viewpoint, an enemy document is any form of recorded information on the enemy nation and its armed forces which originated from enemy sources. The term includes enemy-produced books, periodicals, scientific and technical reports, and the like, which are important sources of information for strategical and high-level tactical intelligence produced and disseminated by the Chief of Engineers and the theater army engineer. At field army and lower levels, the enemy documents most commonly encountered at first hand by engineer agencies are those found on enemy dead or prisoners and at captured headquarters and other record-keeping agencies. These include diaries,

letters, and other personal documents, and also official material such as maps, orders, reports, organizational records, and military and civilian publications.

b. Handling. Some captured enemy documents will contain engineer information which is important to lower or higher engineer commands. However, such documents may also contain information of value to the command as a whole. Moreover, the translation and evaluation of enemy documents is a specialized task for which ordinary engineer intelligence agencies are not qualified. Therefore it is a general rule that enemy documents which come into the hands of engineer troops are to be sent at once to the appropriate intelligence officer.

c. Intelligence Discipline. In a divisional area, captured enemy documents often come initially into the hands of combat soldiers, including engineers. The natural tendency of an untrained soldier is either to throw such a document away or to keep it as a personal souvenir. This tendency must be overcome by organizational training and indoctrination.

32. Collection of Information on Materiel and Installations

a. The ETID(C) is primarily responsible for the field collection of enemy engineer materiel and for examining installations for engineer information. A newly captured area is searched promptly for documents, materiel, and installations. Collection methods for materiel include removing all or parts of an item, making a field evaluation, sketching or photographing it either complete or disassembled, and recording selected technical data. The extent of this work depends on the current intelligence requirements, on available time, and on whether the item can be sent to the rear for a more detailed and leisurely examination.

b. In carrying out the above tasks the ETID(C) needs the understanding and cooperation of combat units and their personnel. To this end it maintains close liaison with engineer combat battalions; with infantry, armored, and artillery units; and with the divisional G2. A representative of the detachment should make frequent periodic visits to the headquarters of these agencies, including especially the intelligence sections of combat units, and should seek permission to assist in indoctrinating combat personnel.

c. The ETID(C) and ETID(R) maintain a situation map showing target data. Information on the location of items of interest, such as enemy engineer dumps and equipment parks, is plotted and noted for prompt investigation.

d. The ETID(C) and ETID(R) also cooperate with the appropriate intelligence agency in interrogating prisoners of war and

enemy civilians who are believed to have technical engineer information.

e. The ETID(R) assigned to a field army coordinates the ETID(C)'s which perform the above functions at corps level. It may assist in field collection if need arises.

33. Reporting Information

a. Channels. An agency which has been ordered to obtain engineer information of any sort makes its report to the officer who gave the order (or to any agency which the order may specify). He in turn, if not himself a processing agent, transmits it to the appropriate intelligence officer for processing. This statement must be qualified in combat and other fast-moving situations, when information may have to be acted on at the level received, or at a higher command level, before there is time for formal processing.

b. Form of Report. Due to the wide variations that exist in the nature of engineer information and the use to be made of it, no form can cover all situations. For typical reports of an engineer ground reconnaissance, see figures 4 and 5.

CHAPTER 7

PROCESSING OF INFORMATION

34. Recording of Information: General

Recording is the first step in processing. In the case of information coming directly to an engineer command or agency, it is done by the intelligence officer or the intelligence section of the staff engineer's office. Records are kept as follows:

- The engineer intelligence journal.
- Engineer intelligence worksheets.
- The engineer intelligence situation map.
- The engineer intelligence files.
- A record of target locations.

35. The Engineer Intelligence Journal

The engineer intelligence journal is the primary permanent record of the operations of the engineer intelligence section. It contains summaries of written and oral messages, orders, reconnaissance reports, conferences, and statements on the disposition of all information. It is closed periodically, usually every 24 hours. At battalion level the intelligence journal is often combined with the operations journal. Figure 6 shows a sample page of an engineer intelligence journal.

36. Engineer Intelligence Worksheets

The worksheet is an indexed pad or looseleaf notebook in which information is recorded systematically and arranged by subject for ready reference and comparison. The worksheet is an aid in the evaluation and interpretation of information, and in the preparation of intelligence reports. Although there is no prescribed form for the worksheet, index tabs are customarily labeled to correspond with the headings of the periodic intelligence reports. The unit's intelligence requirements determine the subject headings used on its worksheet. After an item of information has been recorded in the journal, it is posted under the appropriate subject or subjects on the worksheet. As items become obsolete, they are lined out; as pages become obsolete, they are removed. Figure 7 shows a sample engineer intelligence worksheet.

DAILY STAFF JOURNAL OR DUTY OFFICER'S LOG (AR 220-346 & FM 101-5)						PAGE NUMBER 1	NUM- BER OF PAGES 1	
ORGANIZATION OR INSTALLATION			LOCATION		PERIOD COVERED			
S2, 319th Engr Bn			CHONJU, KOREA (CS 106344)		FROM		TO	
					HOUR	DATE	HOUR	DATE
					1800	11 Feb 51	1800	12 Feb 51
ITEM NR	TIME		INCIDENTS, MESSAGES, ORDERS, ETC.				ACTION TAKEN	
	IN	OUT						
			Weather cold and clear, temperature below freezing					
1		0730	Issued recon orders to recon teams					
2	0910		1st BG found enemy Apers minefield at CS 121651				M - S - F	
3		0918	Requested B Co investigate minefield CS 121651				T	
4	0943		2d BG reports enemy minefield at CS 119321				M - S - F	
5		0950	Requested A Co investigate minefield at CS 119321				T	
6	1535		A Co brought in new type nonmetallic mine discovered at CS 121654. Transmitted to Lt Jones, 533d ETID, by courier					
7		1600	S2 took recon flight in helicopter, returned 1645				M - S	
8	1630		Recon teams returned, submitted recon report				M - S - F	
			* * * * *					
	Legend:	M -	maps; S - staff; T - troops; F - file					
TYPED NAME AND GRADE OF OFFICER OR OFFICIAL ON DUTY						SIGNATURE		
E. C. Rankin, Capt CE						E.C. Rankin		

DA FORM 1594
DEC 50

Figure 6. Sample page, engineer intelligence journal.

37. Engineer Intelligence Situation Map

a. *Description.* The engineer intelligence situation map provides a graphic picture of the friendly and enemy situation. It contains information on such items as terrain, roads, bridges, barriers, enemy minefields, water supply points, enemy depots and dumps, and construction materials. It supplements the worksheets and serves as a base for preparing overlays.

(CLASSIFICATION)

**INTELLIGENCE
WORK SHEET**

FROM : _____

TO : _____

HQ : _____

PLACE : _____

NOTE: Units use headings appropriate
to their needs.
Obsolete pages may be discarded.

(CLASSIFICATION)

SUBJECT HEADINGS
Airfields
Bridges
Camouflage
Construction
Fortifications
Minefields
Order of Battle
Pits & Quarries
Roads
Supply
Surveillance
Terrain
Traffic

(CLASSIFICATION)			
Journal reference	Date	Source	Information
J-3	120910 <i>Feb</i>	1stbg	Apers Minefield at CS121651
J-5	120943 <i>Feb</i>	2d bg	Minefield at CS119321
J-7	121535 <i>Feb</i>	AGO	New type nonmetallic mine discovered at CS121654 - Sent to 533d ETID
MINEFIELDS			
(CLASSIFICATION)			

Figure 7. Sample engineer intelligence worksheet.

b. Coverage. The situation map covers both friendly and enemy territory. Friendly information includes a trace of the frontline, boundaries between major units, and the location of headquarters of major units. Tactical information includes only that which has a bearing on the engineer mission, including internal security. Standard military symbols, as shown in FM 21-30, are used. Posting of detailed data on the face of the map should be kept to a minimum.

c. Timeliness. The situation map must be kept continuously up to date. It is often needed on short notice for urgent purposes for which timeliness is vital, such as briefing the commander or his staff.

d. Sample. Figure 8 shows a section of a typical situation map.

38. Engineer Intelligence Files

a. The journal file contains the originals or copies of all documents entered in the intelligence journal. It supports the journal.

b. A file of photographic negatives is maintained by an engineer intelligence section which has a photographer.

c. Separate files are kept on friendly minefields and on enemy minefields.

39. Target Locations

The intelligence section of the staff engineer keeps up-to-date information on the location, type, and importance of existing and potential targets of interest to engineer agencies. It may be gathered from agents, ground or air reconnaissance, or otherwise. The information is evaluated and either listed by map coordinates or placed on a map overlay, with a notation estimating its accuracy.

40. Evaluation of Information

Evaluation is the examination of information to determine its pertinence, the reliability of the source or agency, and the accuracy of the information. For full details, see FM 30-5.

a. Sources and Agencies. A source of information is the actual origin of information: for example, a captured enemy document. A collection agency is an individual or an organization which obtains information by observation, surveillance, analysis, reconnaissance, and/or interrogation. Collection agencies exploit sources of information. A reconnaissance patrol and photointerpreter are examples of collection agencies which normally obtain information of engineer intelligence value.

b. Credibility of Source or Agency. This is indicated by letters

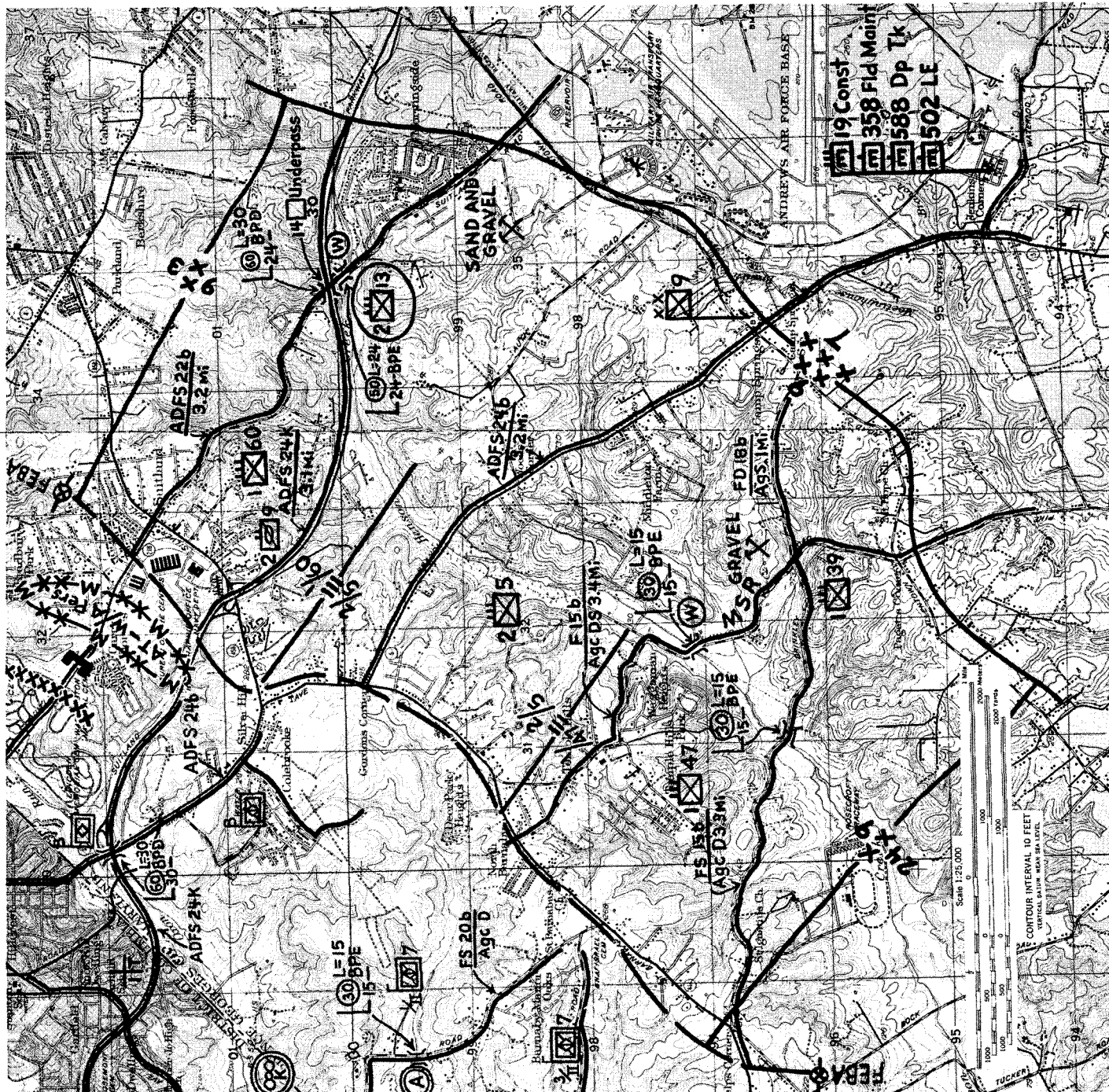


Figure 8. Detail from a typical engineer intelligence situation map.

A to F in accordance with a "credibility code," as shown below. For details, see FM 30-5.

- A—completely reliable.
- B—usually reliable.
- C—fairly reliable.
- D—not usually reliable.
- E—unreliable.
- F—reliability cannot be judged.

c. Consistency With Other Information.

- (1) Any new item of engineer information must be compared with existing and already evaluated information on the same subject. If it is substantially a repetition of a previously received and accepted report, or is consistent therewith, or alleges a fact that would be a logical consequence thereof, there is a *prima facie* probability of its being true, and vice versa. Decision in this field requires good judgment and a thorough knowledge of past reports.
- (2) However, when engineer information arrives concurrently from two or more enemy sources such as deserters and radio intercepts, pointing clearly to a future course of enemy action, it is always *possible* that this represents a systematic program of deception. Therefore a report pointing in the opposite direction from all other reports should never be passed over wholly without thought or study. Probably it is false; yet it might be the one true piece of information which, if acted on, would prevent a successful enemy surprise or deception. Such cases are more common in the field of combat intelligence.

d. Probable Accuracy. This is indicated by numbers 1 to 6 in accordance with an "accuracy code," as shown below. For details, see FM 30-5.

- 1—report confirmed by other sources.
- 2—report probably true.
- 3—report possibly true.
- 4—report doubtfully true.
- 5—improbable report.
- 6—truth cannot be judged.

e. Pertinence. There is always a danger of overloading intelligence files and reports with irrelevant data. If a reported fact has no bearing on our present or future activities in a theater, its truth or falsity is immaterial and it is not worth processing. How-

ever, it must always be borne in mind that a piece of information which is valueless at the headquarters at which it is processed, may be of value to a higher, lower, or adjacent headquarters.

f. Recording of Evaluation. Every engineer intelligence report should indicate the reliability and accuracy of its contents by an evaluation rating as explained in FM 30-5.

41. Interpretation of Information

After an item of information has been evaluated as reasonably accurate and as pertinent, the next step is to decide its military significance and importance. This is the final step in the conversion of "information" into "intelligence." It involves a judgment—in the light of previously processed intelligence, the enemy's situation, and our own situation—as to what consideration should be given to the new item of information. For example, a report might contain the information needed to confirm our previous estimate of the existence of large stocks of enemy construction material in an area where our forces are planning an attack; or, on the other hand, might cast serious doubt on the previous estimate. As a result, tentative plans already formed for engineer supply during and following the attack might be finally adopted, or alternatively might be radically modified.

CHAPTER 8

DISSEMINATION OF ENGINEER INTELLIGENCE

42. General

a. Dissemination of engineer intelligence is its transmission from the intelligence agency which processed it to the users. The latter include other intelligence agencies which may further process it (for example, by summarizing it or combining it with other available intelligence data) for the use of their own commands. The object of dissemination is to insure that interested agencies have all the available facts about the enemy and the situation which are pertinent to their needs and to insure that the factual information and the general intelligence picture, at any given time, are similar or consistent at all echelons.

b. Material disseminated to any one agency is confined to what that agency can use, unless this involves too much selective paper-work. It is in such form that the using agencies can readily locate what they want to know.

c. Material is disseminated upward, laterally, and downward.

- (1) Material disseminated upward is screened to eliminate items which, although of value at and below the level where it was processed, is unimportant at higher levels. In general, the more detailed items are omitted, but there are many exceptions to this rule (par. 6).
- (2) Material disseminated laterally is screened to retain only data of interest to adjacent units or agencies, engineer and other.
- (3) All pertinent engineer intelligence produced at any level is disseminated downward to lower echelons, although not all of it necessarily goes to each recipient in a given echelon.

d. The problem of dissemination downward is usually the most complex and involves the most effort. The material is more bulky and detailed; the time element is usually more acute; and there are more recipients, and hence a greater mechanical problem of reproduction and transmission.

e. The engineer intelligence officer at any level must at all times be familiar with the plans, activities, and problems of his own

engineer, of the command of which he forms a part, and of subordinate engineer commands and agencies. Only thus can he rightly determine the kind, amount, and timing of intelligence which is needed at various engineer levels, and which it is his responsibility to produce.

f. In addition to intelligence, engineer intelligence agencies are sometimes required to disseminate to users engineer information which may be of immediate tactical value. Such dissemination is accomplished when an item of information is of apparent significance to one or more users based on the intelligence officer's prima facie examination, and must be disseminated immediately if it is to be of maximum value. When this type of dissemination is made, proper processing is only postponed, not eliminated. As soon as possible, the information is evaluated and interpreted and further dissemination accomplished as appropriate.

43. Timing

Engineer intelligence must be placed in the hands of those agencies (troop commanders or staff sections) which need it, in time to permit them to make practical use of it in their planning and operations. Disseminating agencies must allow both for time of physical transmission and for time to clear intermediate headquarters before the item of intelligence reaches the ultimate user. This is especially important in the case of dissemination downward; it is also important, in a fast-moving situation, with respect to dissemination in any direction. In urgent cases, partial or fragmentary reports may be sent; summaries may be sent by wire or radio, in advance of a complete report; or incompletely processed intelligence may be disseminated, with a precautionary note incorporated into the text of the report.

44. Channels

a. *Engineer Commander or Intelligence Officer.* The intelligence channels of an engineer commander or engineer intelligence officer are as follows:

- (1) To the G2 of his command, with whom he must establish a closely knit relationship. This does not usually apply in the case of an engineer command which is separated from G2 level by one or more senior engineer headquarters. Thus, in the case of an engineer combat group assigned to a field army, the component engineer battalions would have intelligence channels to group S2, but not to army G2 except in some unusual emergency or disposition of troops.

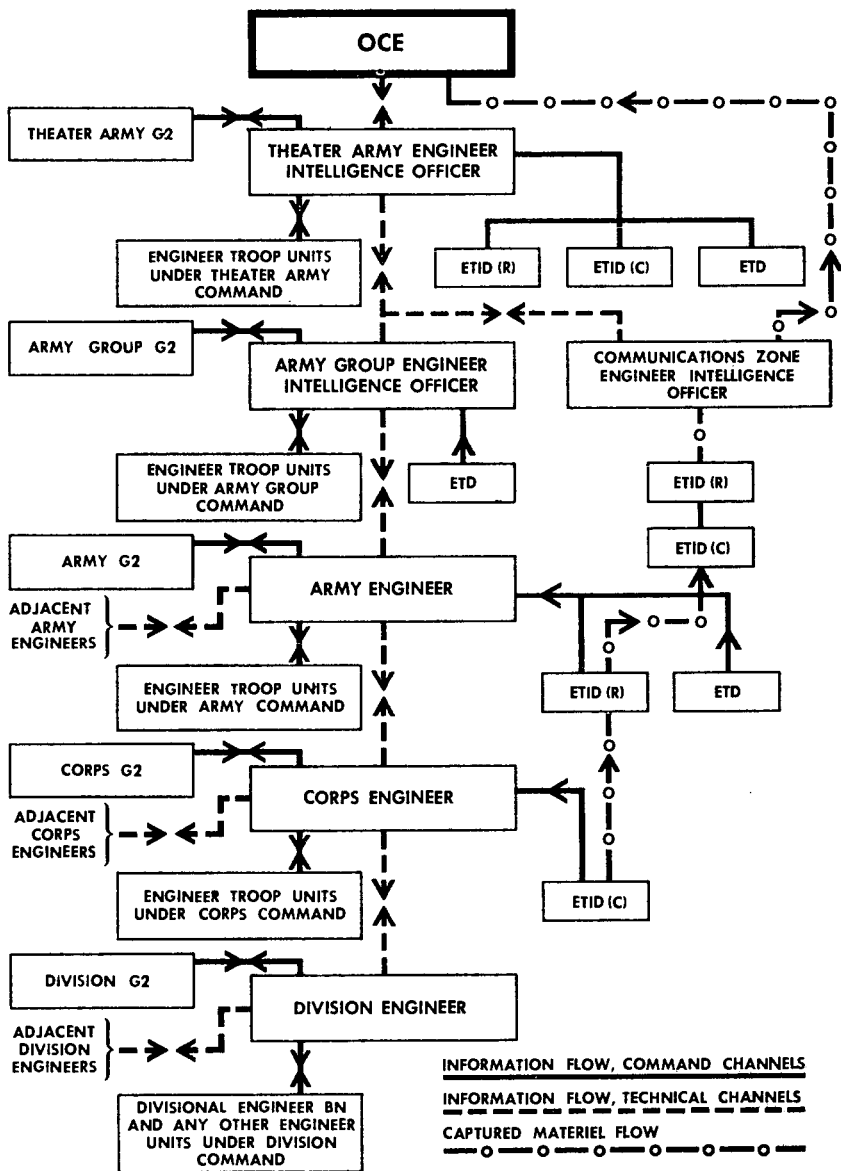


Figure 9. Typical engineer intelligence channels in a theater of operations.

- (2) To the next senior engineer commander or staff engineer. At theater army level this channel goes directly to the Chief of Engineers.
- (3) To all subordinate engineer commands and staff engineers one level below him.
- (4) To engineer intelligence officers of adjacent commands or

agencies at the same level for the exchange of data of mutual interest. This is important with respect to engineer activities or installations near the boundaries between two commands or with which both commands are concerned. Examples are a lateral road crossing two adjacent divisional areas and on which both division engineers are working, and an enemy minefield covering the fronts of two divisions.

- (5) To units of the division, at division level, for the purpose of obtaining engineer information.
- (6) To theater army and theater air force, and to allied headquarters, at theater army level. At field army and lower levels, engineer intelligence officers may have formal or informal channels to their opposite numbers in adjacent allied commands. Such channels will exist if American and allied troops are under the same commander.

b. ETID and ETD. For ETID and ETD channels, see chapter 6.

c. Typical Channels. Figure 9 shows typical engineer intelligence channels in a theater of operations.

45. Means of Dissemination

The means by which engineer intelligence is disseminated include formal reports and documents, informal messages, personal contacts, displays, and the delivery of intelligence materiel.

a. Formal Reports and Documents. See part four for a discussion of formal reports and documents.

b. Informal Messages. These may be by letter, radio, telephone, or messenger. They are especially appropriate for the dissemination of urgent data (by air, motor courier, or electrical means) and for routine contacts, by letter, with intelligence agencies at the same command level and located at a distance. Communication security must always be borne in mind, especially with electrical transmission.

c. Personal Contact.

- (1) This includes briefings, conferences, and informal discussions. It is especially appropriate for dissemination within the headquarters at which the disseminating agency is located and at subordinate and other headquarters which the disseminating officer may visit. Maps, graphs, photographs, and the like should be used in a briefing conference to convey terrain data or other complex items of intelligence. Data transmitted verbally or visual aids should not be overloaded with detail.

- (2) Dissemination by personal contact gets the intelligence to the user promptly and permits the clarification of obscure points by questioning.
- (3) The use of liaison officers may be considered a variant of dissemination by personal contact.

d. Displays. Displays and exhibits are valuable means of disseminating directly to troops such engineer intelligence as data on enemy mines and other materiel. Such displays and exhibits are commonly prepared by ETID's. Terrain models, for indoctrination, briefings, or planning purposes, are a common form of display.

e. Deliveries. Maps or enemy materiel may be delivered to units concerned.

46. Captured Enemy Materiel

a. Captured engineer materiel which comes into the hands of an ETID (C) at corps level and is worthy of further study is sent to the army ETID (R) if easily moved. If not, it is reported to the ETID (R), which decides whether to arrange for its evacuation. If evacuated, it goes first to army ETID (R) for examination and tests of its characteristics and effectiveness. Thereafter it may be evacuated to the communications zone. Tests at army level are generally limited to tactical characteristics. Those in the communications zone are more thorough, and include details of construction.

b. Enemy engineer equipment is frequently sent from a theater to the Zone of Interior, for further evaluation and study by the Chief of Engineers. The same applies to foreign equipment obtained in peacetime from friendly countries.

47. Maps

For the dissemination and issue of maps, map substitutes, and other topographic data, see FM 5-6, FM 101-10, and TM 5-231.

CHAPTER 9

DIRECTION OF THE COLLECTION EFFORT

48. General

a. Direction of engineer intelligence work is concerned with all three of the other steps of the cycle: collection, processing, and dissemination. With respect to collection, it involves the following:

- (1) Determination of the essential elements of information (EEI).
- (2) Preparation of a collection plan.
- (3) Issuance of orders and requests for information to the agencies concerned.
- (4) Continuous check on those agencies.

b. Direction of the collection effort of engineer information at any level of command is in the hands of the engineer of the command, subject to the commander's policies and to the supervision of the intelligence officer.

c. For full details of directional activities, see FM 30-5 and FM 30-7.

49. Engineer EEI: Definition

a. A large number of items pertaining to a wide variety of natural objects and phenomena, works of man, and human activities are of *potential* interest to engineers and other military agencies. Categorical lists of such items are contained in part five.

b. Essential elements of information, engineer or other, are defined as "the specific information of an actual or potential enemy and of terrain, meteorological, and hydrographic conditions which a commander needs in a particular situation in order to accomplish his mission." Therefore, which particular items of engineer information are "engineer EEI" in a given situation depends wholly on the situation. For example, if a division has the mission of forcing the crossing of a large unfordable river against enemy resistance, certain of the items listed in paragraph 82 become EEI, including the width, depth, and velocity of the stream, its bottom, its banks, its propensity for flooding, and the location of suitable crossing sites of different categories. Assume that, concurrently,

the plans of the theater commander contemplate the future use of this stream, after our troops have advanced further, for the waterborne movement of supplies, and that he desires advance planning to that end. In such a case the EEI at theater level will include a number of items listed in paragraph 92 (such as the navigability of the river, aids to navigation, canalization structures, river ports and transshipment facilities, and so on) which are irrelevant to the present needs of the attacking division; while, on the other hand, some of the above listed EEI which the division must collect are not EEI to the theater engineer.

50. Designation of Engineer EEI

a. The designation of engineer and other EEI is a responsibility of the commander, assisted by his staff, principally the intelligence officer.

b. The recommendation of appropriate engineer EEI to the intelligence officer, for approval by the commander, is a responsibility of the staff engineer, and one which, in the absence of a specific directive, he must undertake on his own initiative. In this task he relies largely on the intelligence section of his office.

c. The intelligence officer, in addition to the needs of his own command, may receive calls from a higher echelon of command for items of engineer intelligence or information needed at that level. If such items are not already available, he instructs the staff engineer to add them to his collection plan. Similar calls may come to the intelligence officer through intelligence channels, or to the staff engineer through technical channels, from lower echelons.

d. When engineer EEI have been announced, they of course guide the activities of agencies which collect engineer information. However, those agencies should also collect and transmit any other information which comes to their attention and appears to have a bearing on the situation.

e. All engineer intelligence teams have a responsibility for giving sound direction to the collection effort in any unit to which they are assigned. They attain this end primarily by recommendation and liaison. The team commander should—

- (1) Recommend to the unit commander the issuance of suitable directives to his command.
- (2) Pay frequent visits to engineer and other combat units of the command, especially combat battalions, and to intelligence sections. He should acquaint them with the importance of, and the techniques for, collecting and re-

porting information on enemy materiel and should assist in indoctrinating troops.

51. Collection Plan

a. General. Based on his list of EEI, and other requirements for engineer intelligence and information, the engineer or his intelligence officer prepares a collection plan. This is an aid and is not disseminated. There is no rigidly prescribed form for a collection plan. Normally it will contain the following:

- (1) The unit for which the information is being collected.
- (2) The period.
- (3) A tabular list of EEI.
- (4) If necessary an analysis (*b* below) of each item of the EEI, to determine what specific indications (clues to the answer) the collecting agency should look for.
- (5) A tabulation of the agencies which are to be instructed to collect each item of information.
- (6) A notation of when and where each agency is to submit its report.

b. Analysis of Items of EEI. Whether this is necessary in any given case will depend in part on the nature of the item. Thus, if information is desired on enemy activities in a particular area or directed to a particular end, the agency preparing the collection plan, having a background of previous intelligence, may know that certain specific indications would have a bearing on the problem. These should be entered on the collection plan, with a notation of the corresponding instructions to be given the collecting agency. If the EEI are factual data on terrain, construction materials and equipment, and the like, as engineer EEI more commonly are, such analysis is often needless. However, the skill and experience of the collecting agency and its knowledge in specialized fields must be taken into account. For example, when seeking information on the stability of a stretch of bank along an alluvial river where a water-supply intake or bridge abutment is contemplated, there are certain physical indications of bank stability or instability with which an ordinary engineer reconnaissance party, unless it included a hydraulics specialist, might not be familiar.

c. Selection of Agencies. In deciding on the agencies to collect EEI, care must be taken to select, in each case, those best qualified for the task by training and location, and also to balance the load fairly among them with regard to their other duties. In general it is better to assign at least two agencies to each item of EEI.

Unit: 1st Engr Bn Information required in connection with proposed river crossing By: Bn S2 For: Div G2, Bn hq Area to be studied: Triangle SHARON - PETERSVILLE - ALLIANCE bounded by State roads 106, 107, and 88 Limiting hour and destination of reports: 191730 Jul 57; Bn S2 Essential elements of information	Agencies (Check agencies to be employed)									
	Request corps engr	Asst div engr	S2	S3	S4	Co A	Co B	Co C	Bn reconnaissance off	Liaison plane
1. What are the sites on PEMBERTON RIVER between WAVERLY and NORTH SHARON suitable for: (1) assault boat crossings, (2) footbridges, (3) ferries, and (4) ponton bridges (three alternative sites for each)?				(X)		X	X	X	(X)	(X)
2. What in detail is the condition of: (1) the SHARON-WAVERLY road (State 106), (2) the SHARON-NORTH SHARON road (State 107), and (3) all roads between them?						(X)	(X)	(X)		
3. What information is obtainable on (1) the WAVERLY-ALLIANCE road (State 106), (2) the NORTH SHARON-PETERSVILLE road (State 107), and any roads that the enemy may have built in the area between State road 88 and the PEMBERTON RIVER; including information on the partially destroyed bridges over the river at WAVERLY and NORTH SHARON?		(X)	(X)						(X)	(X)
4. What natural cover, and what natural concealment, are available along both sides of the PEMBERTON RIVER between WAVERLY and NORTH SHARON?			(X)	(X)		(X)	(X)	(X)	(X)	(X)
5. What are suitable locations for supply points, between State road 88 and the PEMBERTON RIVER, for dumping fortification materials to be used in organizing our position after the crossing?					(X)				(X)	(X)
6. What enemy minefields can be identified?			(X)						(X)	
7. What are suitable sites for minefields and road-blocks to be placed by our troops, while organizing the position after the crossing?				(X)		X	X	X	(X)	(X)
8. What are the locations and amounts of any engineer construction materials, especially sand, gravel, crushed stone, and milled lumber, suitable for use in the repair and construction of roads and bridges?	(X)	X		(X)	(X)	(X)	(X)	(X)		

Figure 10. Typical collection plan of an engineer battalion for engineer EEI (terrain information).

d. *Timing of Reports.* A report may be called for at a specific time, periodically, or as the information is obtained.

e. *Extent of the Plan.* The extent, detail, and formality of a collection plan will vary with the level of command. Thus, in a combat company it might be a brief pencilled notation, whereas at field army level or higher it might be a detailed formal document.

(1) For an example of a plan for collecting strictly combat information, see FM 30-5.

- (2) Figure 10 shows a typical collection plan prepared by S2 of a divisional engineer battalion, for collecting certain EEI for division headquarters and the battalion. The assumed situation is that of a division planning a river crossing. The division has three battle groups in line, each of which has a sector of the front and has a lettered engineer company, supporting it. Our troops hold the ground on the south side of the river, although small groups of the enemy may still be concealed there. Division G2 has called on the engineer battalion for data on crossing sites, road conditions, and the like. The battalion S2 incorporates these, as EEI, into his collection plan, adding other items, such as the location of construction materials, which are of interest to his battalion. He then notes, with check marks, what agencies are in a position to obtain the information; and after study, circles the check marks for the agencies which he decides to call on. Suitable orders to those agencies are then issued. Since the EEI are factual data of a type familiar to all trained engineer personnel, no analysis (*b* above) is necessary. No needless material is placed on the plan. For example, the lettered companies know the limits of their respective sectors, which therefore do not have to be specified in the plan or the orders. Again, the selection of crossing sites will involve the use of the aerial reconnaissance plane, probably by S3 and the reconnaissance officer, to make a tentative selection of sites, followed by ground reconnaissance. Instructions to this effect, however, would be needless even in the orders issued to those agencies if the unit is well trained; and in any case would not appear on the collection plan.

f. Relation to Other Engineer Planning. Accurate and timely information is the basis of all sound planning. A collection plan is therefore an integrated part of engineer planning considered as a whole.

52. Issue of Orders and Check on Collecting Agencies

Based on the completed collection plan, the intelligence agency preparing it issues the necessary orders to the collecting agencies or arranges for their issuance through the proper channels. Thereafter it makes any necessary checks to insure that the information is promptly and adequately obtained and reported.

PART FOUR
PRODUCTS AND USES OF ENGINEER INTELLIGENCE
CHAPTER 10
ENGINEER INTELLIGENCE PRODUCTS

53. General

The products of engineer intelligence are documents and other physical objects which convey processed engineer information to agencies that require it for planning and operations. They are produced at various levels. The principal types are described briefly below.

54. Engineer Intelligence Studies and Special Engineering Studies

a. Special Engineering Studies (SES) were formerly produced by the Chief of Engineers. They described in detail the natural and manmade features of an area that do or would affect the capabilities of military forces. Often they were in the form of folios with text keyed to overprinted maps. Studies produced in the past remain on file, and are sometimes the best available body of engineer intelligence on a particular area.

b. Engineer Intelligence Studies (EIS) have replaced SES as one of the standard types of publications of the Chief of Engineers. They are produced for the use of appropriate agencies of the Corps of Engineers and such other agencies as may be approved by ACSI (Assistant Chief of Staff, Intelligence). They contain intelligence which is not readily available elsewhere and is needed for carrying out engineer missions. They may deal with any topic pertinent to engineer intelligence. For example, an EIS may cover: (1) an individual item of equipment, or the same type of equipment on a country-wide, continent-wide, or world-wide basis; (2) hydrologic and hydrographic characteristics of a single waterway in detail, or of all the waterways in a country in general terms; or (3) the regional aspects of vegetation or cross-country movement, or the terrain of an entire country, a group of countries, or a continent. An EIS is usually capable of standing alone.

55. Engineer Intelligence Guides

Engineer Intelligence Guides (EIG) deal with the procedures used in collecting, processing, and disseminating engineer intelli-

gence. They are produced by the Chief of Engineers for the use of appropriate agencies of the Corps of Engineers and such other agencies as may be approved by ASCI. They provide guidance, along the above lines, on all subjects of interest to the Corps of Engineers. For example, an EIG may be (1) a collection guide on a specific item of equipment, or on all the engineer materiel of a country; (2) an orientation guide on one subject of interest, or on all of the subjects of interest to the Corps of Engineers; (3) a photo-interpretation key on the urban areas of one country, or on the urban areas of the world in general; or (4) a glossary of terms on natural terrain features, or on all terrain features. In general, EIG's fall into the following broad categories: (1) collection, (2) training and orientation, (3) photo-interpretation keys, (4) production of studies, and (5) processing of information.

56. Engineer Intelligence Notes (EIN)

Engineer Intelligence Notes (EIN) contain timely and current data on engineer intelligence subjects at the lowest possible security classification. They are produced by the Chief of Engineers for wide dissemination to engineer units and staff personnel, for general orientation and training purposes. Engineer commanders and staffs are encouraged to use EIN's to the greatest possible extent, both as sources useful information and to keep engineer personnel intelligence-conscious.

57. National Intelligence Survey (NIS)

While the National Intelligence Survey is not an engineer intelligence product, it may be mentioned briefly here. It is a concise digest of basic intelligence on foreign countries, intended for use in strategic and high-level operational planning. It is a Department of Defense document, to which contributions are made by various agencies, including the Chief of Engineers. Topics dealt with include military geography; transportation and communications; sociological, political, economic, and scientific factors; the armed forces; and map and chart appraisals.

58. Terrain Studies

A terrain study is an intelligence product which presents an analysis and interpretation of the physical characteristics of an area and their effects on military operations. Its objective is to provide intelligence for the plans and operations of the commander, his staff, and engineer agencies. The coverage varies according to the command level for which the study is intended and the size and complexity of the area involved. Below is a list of topics, with

pertinent data thereon, that might be included in a complete terrain study; but in any specific case, no more of these would be covered than the situation called for. Liberal use should be made, in a terrain study, of maps, overlays, graphs, and other means of presenting information clearly and simply. For further details, see FM 30-5 and FM 101-5.

a. Identification of Area Studied. Refer to paragraph 80.

b. Period of Time Covered. The report must be appropriate to the entire period of time during which it is intended to be used as a basis for planning or operations. Unless this period is short, account must be taken of the seasonal variations of such natural features as weather, vegetation, and river stages. Where forecasts must be based on probabilities, such as for floods, it may be desirable to study records extending back many years if time permits.

c. Weather and Climate. Refer to paragraph 87.

d. Landforms. Refer to paragraph 81.

e. State of Ground. Give information of the basic characteristics of the surface (pars. 83 and 84).

f. Trafficability. State the trafficability of the different sections of the area for men and for vehicles of various types and sizes, giving consideration both to the inherent characteristics of the surface and to its present condition as affected by rain, snow, drought, the cycle of crop cultivation, previous military movements and operations, and any other applicable factors.

g. Natural Barriers and Obstructions. Give terrain features which prevent, obstruct, or slow down movement, including precipitous mountains; snow and icefields; deep valleys, canyons, and gorges; areas of surface rock or boulders; sand dunes; desert areas; obstructive vegetation (par. 85); and unfordable rivers and other bodies of water (par. 82). Describe any extreme climatic conditions (par. 86).

h. Water Resources.

- (1) Enumerate natural sources of surface water (streams, lakes, and large springs). For each, give appropriate data from paragraph 82. State also any unusual obstacles to the exploitation of each source, such as excessive contamination, precipitous banks, undue visibility for enemy ground observers, or remoteness from existing road net.
- (2) Give similar data for subsurface sources (springs, wells, and underground flow in dry streambeds). Individual sources may be reported if the area is small, otherwise average or total figures may be given.

(3) List any already developed water-supply systems. Give data called for in paragraph 100b.

(4) If information on water points is desired, give, for each point, data on the source as in (1) or (2) above, and the following data on the site; area; topography; soil and drainage conditions; cover; distance from nearest major road, preferably the main supply route of the unit to be served; time and effort involved in building approach road, hardstandings and turnaround; and the number of tank trucks or equivalent that could be served at once.

i. Sites. Locate and give characteristics of suitable sites for any military installations or activities which are contemplated in the area, including roads, bridges, pipelines, airfields, drop zones, camps, depots, hospitals, and training and recreational areas.

j. Lines of Communication. Refer to chapter 15.

k. Urban Areas. Refer to paragraph 98.

l. Electric Power and Other Pertinent Cultural or Economic Features Having a Bearing. See appropriate paragraphs in chapters 16 and 17.

m. Hydrography. Refer to paragraph 82.

n. Tactical Aspects of the Terrain. This deals with an area from the viewpoint of our forces moving into it to establish a defensive position or make a further advance. Coverages of the topic will vary with the force and mission. The items listed below are common to all tactical operations. If a report on any of them repeats material listed under any of the preceding subparagraphs, the former should be omitted.

(1) *Observation.* Effect of the terrain on observation by ground and air observers and by electronic and sonic devices.

(2) *Fields of fire.* Consider high-trajectory and low-trajectory conventional weapons, and nuclear artillery.

(3) *Cover.* Natural cover available for men, equipment, installations, and routes of communication.

(4) *Concealment.* Natural concealment available, having regard to both landforms and vegetation. Seasonal variations. Adaptability of terrain to artificial concealment.

(5) *Obstacles.* Consider both natural and artificial obstacles.

(6) *Movement.* Trafficability of the terrain and routes of communication, for marching men and military vehicles. Use standard color code to describe movement conditions.

- (7) *Key terrain features.* This includes commanding heights, natural defensive positions, bodies of water, stream crossing sites, and artificial flooding possibilities.
- (8) *Avenues of approach.* Consider existing or contemplated positions, both friendly and enemy.
- (9) *Landing beaches.* Give location and length; general description of the area; data called for in paragraph 82e; adequacy of the immediate coastal area for a beachhead, with respect to length (along the seafront), depth, slopes, regularity of terrain, and trafficability; and data on the area immediately inshore from the beach, in full topographical detail, to include water, cover, road net, positions that might be (or actually are) occupied by a defending enemy force, and the probable time and cost to an attacking force involved in landing, establishing a beachhead, and moving inland against resistance.

o. Engineering Aspects of the Terrain. This includes construction sites; construction conditions; road and other engineer work called for; locally available construction materials, labor, and other resources; and water.

59. Enemy Materiel Reports

Reports on enemy materiel are an important product of engineer intelligence in a theater of operations. Below is a suggested outline for such a report. However, due to the wide variety of engineer materiel that may be encountered, no rigid form of report can be prescribed covernig all cases. Therefore the outline given may be modified as to either content or arrangement if the situation warrants. An example of a report on enemy materiel is shown in appendix IV.

a. Introduction. Give the name of the item (foreign and English), model number, and markings. State how captured or otherwise acquired, when, where, by whom, and from what unit. State the source of this information (agency which captured the item or other), and evaluate it in accordance with paragraph 40.

b. Research. Give a summary of the research which has gone into the preparation of the report, including reference materials consulted.

c. Description. Include physical characteristics (attach photographs, drawings, or sketches) and details of mechanical operation, including defects and weaknesses.

d. Field Tests. Describe any field tests made of the item, and the results.

e. Use. Describe the known or probable employment of the item, its effectiveness, and the extent to which it is in use.

f. Countermeasures. If appropriate, state what countermeasures our forces could or should employ against the item.

g. Production. Give available data on manufacture, including production data, export and import data, and manufacturing processes (casting, forging, machining, filing, etc.).

h. Conclusions. Give the physical and operational characteristics of the item as compared with the equivalent item used by our own forces. Submit a field evaluation (effectiveness, durability, rate of production, and effect on morale of friendly troops). Present any recommendations.

i. Disposition. State the disposition made of the item (when, where, and to whom it has been sent).

60. Other Intelligence Reports

Among the wide variety of subjects on which special reports and studies may be made by engineer intelligence agencies, the following are of importance:

a. Enemy Construction (par. 113).

b. Enemy Mapping. Discuss the enemy procedures and techniques (to include surveying and the establishment of controls) used in the preparation, reproduction, storage, and distribution of topographic maps, plastic relief maps, terrain models, photomaps, mosaics, map manuscripts, and allied products. Discuss and analyze captured enemy maps and mapping material, with comments on their accuracy and completeness. The extent to which an enemy map reveals a knowledge of our own dispositions and activities may be a matter of immediate interest to military intelligence agencies.

c. Order of Battle.

d. Personalities (par. 120).

e. Technical Procedures. Other special reports may be needed on the procedures and techniques adopted by the enemy in any field of military engineering. The form of such a report will depend on the activity dealt with. It should always include a discussion of the strong and weak points in the enemy's procedures, a statement of the lessons to be learned from them, and any recommended countermeasures.

61. Displays and Exhibits of Enemy Equipment

Refer to paragraph 46.

62. Routine Engineer Intelligence Reports

Certain routine reports are prepared by engineer intelligence agencies at various levels. They include engineer intelligence periodic reports, engineer intelligence annexes, engineer intelligence estimates, and engineer intelligence summaries. Reports of this category are not peculiar to the Corps of Engineers or to engineer units and intelligence agencies, and are described in FM 30-5. They will not be discussed further here. For examples of an engineer intelligence periodic report and of an engineer intelligence annex, see appendixes II and III.

CHAPTER 11

CATEGORIES OF ENGINEER INTELLIGENCE

63. General

Engineer intelligence includes topics which are of interest to, and affect the activities of, every branch of the military service and every kind of military operations. Its principal categories are listed below, with an indication of what Army agencies may be concerned with them. For the application of such intelligence to strategic, logistical, tactical, and research and development activities, see chapter 12. For a detailed breakdown of the general categories, see part five.

64. Natural Geographic Features

Intelligence on landforms is needed by most military units in a theater, especially combat and service units engaged in offensive or defensive operations. Hydrographic and hydrological intelligence on streams, lakes, marshes, estuaries, and other bodies of water is of interest from the viewpoint of their passage by troops, their adaptation to defensive purposes, their use for water supply or transportation, or the possible interference of floods with military operations. Data on weather and climate are of universal interest. Data on the use of land by the local population, the nature and trafficability of soils, the presence of surface rock, and the kind and distribution of vegetation are needed in connection with such matters as concealment and cover, cross-country movement, and field fortifications and the establishment of defensive positions. Among other natural features and phenomena which may affect military operations are caves, earthquakes, and volcanoes.

65. Lines of Communication

All military agencies concerned with the movement of troops, materiel, or supplies require full data on roads and railroads, including bridge data. The same is true regarding any rivers, canals, or other bodies of water which are or could be used for transportation; and of commercial airfields and their facilities. In an actual or potential theater served by seaports, intelligence on the facilities and potentialities of such ports is needed for planning and

logistical purposes. Of more specialized interest are data on pipelines used to move liquid fuel.

66. Other Cultural Features

A great deal of intelligence on urban areas in a theater is required by Army agencies concerned with the attack or defense of such areas, their use for quartering troops and locating military installations, their exploitation for supply and maintenance purposes, or the control of the civilian population. (Not all intelligence of this category is engineer intelligence.) Structural data on buildings which may be used for military purposes are needed to determine their capacity, the uses to which they can be put, their vulnerability to artillery or air attack, and the time and effort involved in any needed repairs or alterations. In areas where our troops are to be served by local public utilities (water supply, sewage disposal, electric power, illuminating gas, public transportation systems, telephone and radio systems, fire protection agencies, and trash and garbage disposal agencies), detailed data thereon are required by the Army agencies which must operate, or supervise the operation of, such utilities, or are concerned with the quartering, supply, and health of troops. Data on mining operations are needed if and to the extent that their products are of military interest; and on sand and gravel pits, and quarries, by the engineer construction agencies which may use them.

67. Industrial Facilities

The Corps of Engineers is greatly interested in manufacturing and other industrial establishments which produce, service, or distribute supplies or materiel used in construction or other engineer activities. It is also interested in the construction potential of the nation or area under study. Various Army supply and transportation agencies need data on the production and available stocks of petroleum and its derivatives; of coal, lignite, and peat; and of any other mineral products having military value.

68. Military Data

The defenses and defensive doctrines of an actual or potential enemy or ally are of vital interest to all agencies of our Army concerned with planning or conducting military operations in that nation's territory. The Corps of Engineers is interested in data on construction facilities and capabilities. Also, for the purpose of **estimating that nation's military engineer potential**, it needs full data on engineer material, training, operations, organization, and logistics, and on its key military engineer personnel.

CHAPTER 12

APPLICATIONS OF ENGINEER INTELLIGENCE

69. General

The categories of engineer intelligence listed in chapter 11 enter, in varying degrees, into strategic planning, logistical planning and operations, tactical planning and operations, and research and development. In some instances, also, items of intelligence are merely kept on file for possible future use.

70. Strategic Planning

Strategic planning is worldwide. Most emphasis is given to actual or potential enemies and to friendly nations on whose territory we are or may be fighting with as an ally. Within any nation it is especially concerned with actual or possible areas of operation of our own forces, but it is not restricted to those areas. Engineer intelligence needed in such planning includes the data listed below, for a nation as a whole or a particular area as the case may be.

a. Data on Terrain. This should include major features, such as large rivers, mountain chains, deserts, large swampy areas, coastal areas, jungles, forests, grasslands, and agricultural and urban areas.

b. Weather and Climatic Data.

c. Transportation Data. This should include the railroad, air, and navigable waterway transportation systems and their carrying capacities, with available equipment; the road net; and the principal ports, including major characteristics, normal capacity expressed in number of berths, number of ships loaded and unloaded in a given time, and amounts of general and special cargo passing through the port.

d. Mineralogical, Agricultural, and Industrial Production Data. This should include the extent to which the production could be diverted to the needs of our armed forces, or to the provision of such support to the civilian population and refugees as may legally be required. Principal centers of population should also be covered.

71. Logistical Planning and Operations

Categories of engineer intelligence that *may* be needed for this

purpose are listed below. To what extent the listed items will, in fact, be needed depends on the level at which the planning takes place.

a. Natural geographic features so far as they affect logistical activities, including sites for all types of military installations.

b. Lines of communication; data discussed in chapter 15.

c. Resources of area and works of man: such items of the categories discussed in chapters 16 and 17 as have a bearing on the logistical problems of the command.

d. Data bearing on supply, including water supply.

e. Special engineer technical studies on such subjects as enemy engineer construction, equipment, and techniques (ch. 18).

72. Tactical Planning and Operations

This will require the categories of engineer intelligence listed below. Terrain studies (par. 58) are extensively used in tactical planning.

a. Natural geographic features (ch. 14) so far as they affect the plan of maneuver.

b. Roads.

c. Enemy defensive systems.

d. Certain of the data needed also for logistical planning.

73. Research and Development

Technical intelligence on captured enemy materiel and other foreign materiel is valuable to the research and development agencies of the Chief of Engineers, both in adapting any useful ideas to U. S. equipment and in devising countermeasures where there is need. For intelligence reports on such items, see paragraph 59 and appendix IV.

74. Examples of the Application of Engineer Intelligence

Below are given three examples of the questions that an engineer intelligence officer or staff engineer would be called on to answer, based on engineer intelligence, in connection with the planning and execution of particular kinds of military operations. Certain of these would enter into the planning of the commander and his staff, while others would be of interest primarily to the engineers themselves. For some of the questions, engineer intelligence would be the only source of the needed data. In other cases it would be supplemented by intelligence from non-engineer agencies, such as air and ground reconnaissance parties not under engineer direc-

tion. For the detailed items of information that must be collected and processed in order to answer the question, see part Five.

a. *River Crossing.* In connection with a deliberate tactical river crossing, not airborne, against enemy resistance, the engineers would furnish data on:

- (1) Weather to be expected during the operation, with special reference to possible flooding of the river, or the movement of ice or debris, on a scale that would jeopardize the crossing.
- (2) Full information on topography and landforms on both sides of the river, including any natural barriers or obstructions to the advance of our troops other than the river itself.
- (3) Location and trafficability of roads on both sides of the river; location of any actual or potential defiles, including bridges or large culverts that might be destroyed by the enemy.
- (4) Trafficability of the soil, both now and under any weather conditions that may be expected during the operation; with special attention to areas adjacent to the proposed crossing sites and along the routes of approach thereto.
- (5) Concealment and cover, especially on the friendly side of the river.
- (6) Data on enemy defenses on both sides of the river or in the river, including minefields and roadblocks. States whether the enemy can produce artificial flooding of the river, with details.
- (7) Sites for storm boat or assault boat crossings, footbridges, ferries, vehicular bridges (floating and/or fixed), and dummy bridges if contemplated. (It is often desirable to locate two or more alternative sites for each installation, give advantages and disadvantages of each, and recommend which should be selected.)
- (8) Avenues of approach to the assembly and parking areas, the crossing sites, and the successive objectives of the attacking force.
- (9) Sites for engineer dumps, parks, and regulating points.
- (10) Location, nature, and amounts of engineer construction and other materials located within the area of the operation.
- (11) Water points for use during the operation.
- (12) Data on enemy engineer troops within the area and their capabilities.

- (13) Any special data needed in connection with the possible employment of nuclear weapons.

b. *Airhead.* In connection with the seizure of an airhead, the engineers would furnish data on:

- (1) Weather to be expected during the operation, with special reference to high winds, heavy rain or fog, or other conditions that might affect air landings and airdrops. (Weather information supplied by Engineer intelligence is based upon data from historic compilations, short-range meteorological forecast data is not the responsibility of the Corps of Engineers.)
- (2) Full information on topography and landforms within the proposed airhead, especially along and outside its perimeter; including also any prominent landmarks, visible from the air, that might guide the attacking force. If time permits, a terrain model of the airhead may be called for.
- (3) Natural barriers and obstructions, especially any located along the perimeter of the airhead that may be adapted to defensive purposes.
- (4) Location and trafficability of roads within the airhead and in the surrounding area; locations of any actual or potential defiles, including bridges or large culverts that might be destroyed by the enemy.
- (5) Trafficability of the soil, both now and under any weather conditions that may be expected during the capture and occupation of the airhead.
- (6) Nature of the soil as affecting the installation of perimeter defenses and the construction of airstrips.
- (7) Cover and concealment, both within the airhead and along its perimeter.
- (8) Data on enemy defenses, including minefields and roadblocks; and on any other enemy military installations within the area.
- (9) Data on any enemy civilian installations within the area, such as towns, isolated buildings, public utilities, and the like, which might have some military use.
- (10) Data on existing landing fields and landing strips, and proposed sites for drop zones and for any additional air strips needed. In both cases include estimates of their maximum absorption capacity in terms of aircraft and parachutists.
- (11) Sites for engineer dumps and parks.

- (12) Location, nature, and amounts of engineer construction materials located within the airhead, including any enemy engineer stocks which may be expected to fall into our hands; with special reference to items useful for the construction and repair of air strips and for hasty fortifications.
- (13) Water points for use during the capture and occupation of the airhead.
- (14) Conditions as to observation and fields of fire, and covered approaches, along the perimeter of the airhead.
- (15) Data on enemy engineer troops within or adjacent to the airhead, and their capabilities.
- (16) Any special data needed in connection with the possible employment of nuclear weapons.

c. Defensive Position. If the commander plans an advance into enemy-held territory, followed by the organization of a defensive position therein, the following data will be expected from the engineers in connection with organizing the position:

- (1) Weather to be expected over the period of the organization and occupation of the position, with special attention to extremes of heat and cold and of drought and precipitation. (Weather information supplied by engineer intelligence is based upon data from historic compilations, short-range meteorological forecast data is not the responsibility of the Corps of Engineers.)
- (2) Full information on topography and landforms, and on any bodies of water, both within and on the enemy side of the proposed position. Include data on observation and fields of fire, on covered approaches from our own and the enemy side, and on natural barriers and obstructions that may be adapted to defensive purposes. If time permits, a terrain model may be called for.
- (3) Location and trafficability of roads within and on the enemy side of the position; extent to which roads within the position are or could be shielded from enemy ground observation.
- (4) Roads, railroads, and other forms of communication leading to the position from our side.
- (5) Trafficability of soil within and on the enemy side of the position, under all weather conditions that may be expected.
- (6) Nature of soil from the viewpoint of installing both hasty and deliberate field fortifications.

- (7) Natural cover and concealment within and on the enemy side of the position; variations of natural concealment that may be expected with the seasons.
- (8) Data on any enemy military or civilian installations within the area that may have a bearing on the establishment and occupation of the position.
- (9) Sites for the various defensive elements of the position.
- (10) Sites for engineers dumps, parks, and other facilities, both during and after the construction of the defensive works.
- (11) Location, nature, and amounts of engineer construction materials within the area.
- (12) Water points for use during the establishment and occupation of the position.
- (13) Any special data needed in connection with the possible employment of nuclear weapons.

75. Intelligence for Future Needs

At all levels, but increasingly as one goes upward, there exists intelligence having no immediate application, which is kept available for possible future developments. At the level of the Chief of Engineers, the principal part of the intelligence effort in peacetime is directed to this end (ch. 10). The procedure is especially applicable to items which remain permanently unchanged, such as terrain forms and data, and to works of man which, once created, are likely to remain unchanged over a long period or to change only by expansion.

76. The Time Element

In all fields of utilization, but especially in tactical and logistical operations at field army and lower level, periodic changes in the situation require that engineer intelligence be kept constantly up to date. The initiative for this must come from engineer commanders and staff officers. In a fast-moving situation, continuous reconnaissance and processing of information are required of such items as captured enemy construction equipment, materials, and resources; water sources; terrain, roads, bridges, ferries, and unfordable bodies of water; and ground cover, airstrips, and enemy defenses, including mines and minefields.

PART FIVE

BASIC ELEMENTS OF ENGINEER INFORMATION

CHAPTER 13

GENERAL

77. Scope of Basic Engineer Information

As explained in chapter 11, factual data of interest to the Corps of Engineers cover a wide field. In an actual or potential area of operations they include natural geographic features, means of communication, other cultural features, and economic activities; and with respect to any foreign nation, they also include data on its armed forces and population. In each of these areas of interest there are many individual items on which detailed information may be needed. Chapters 14 to 18 consider such items, and the principal headings of information pertaining to each.

78. Information Needed in Specific Cases

Paragraph 49 defines "essential elements of information" (EEI) and explains that the question of what information, in any field, is included in engineer EEI depends on who will use the processed information, when, where, and in connection with what mission. There is thus a clear distinction between the *basic* elements of engineer information (which include all data that might be needed by anyone at any time, and for any purpose) and the *essential* elements of information needed for a particular purpose. Intelligence officers, in preparing collection plans, should bear this distinction in mind, and not overload their collection plans with EEI which are not actually needed. The checklists in the succeeding chapters are therefore only a guide to intelligence officers in preparing collection plans, and not all of the items on a particular checklist need be used in any given situation. On the other hand, special conditions may call for items of information which are not on a checklist.

CHAPTER 14

NATURAL GEOGRAPHIC FEATURES

79. General

The topics as described in this chapter should be covered when information is to be furnished on natural geographic features.

80. Name and General Information

Give the name (if any) of the area studied and the name of the geographical or political entity of which it is a part. Give boundaries, area in square miles or acres, and any general information not covered elsewhere.

81. Landforms

The following information should be given on landforms:

a. General Description of Topography. Give brief general description of the topography; for example, "gently rolling and well-drained terrain except for swampy area in the eastern portion." Give map reference.

b. Relief and Drainage. Give relief and drainage systems, including ridges, streams, slopes, and the shape of the land. A contour map, if available, gives such information directly. It may be made more graphic and informative by shading or coloring; this will emphasize high and low areas and the location of important divides. In the absence of contours, relief can be shown less accurately by hachuring.

c. Areas for Large-Scale Military Activities. Give the location and extent of areas lending themselves topographically to large-scale military activities such as construction, movement, cover, airborne landings, etc.

82. Hydrography and Hydrology

The following information should be provided on hydrography and hydrology:

a. Rivers and Streams. For each important stream give the information listed below, or such items as are appropriate to the size and nature of the stream. In the case of a large area and a long

river, different stretches of the river may be reported separately. In the case of numerous small streams, average characteristics of the group may be reported briefly.

- (1) Name.
- (2) Drainage area.
- (3) Maximum and minimum flows (both average annual and long-term), widths, depths, and velocities. State whether there is a propensity to sudden flooding.
- (4) Ice conditions, including ice floes and jams in thaws.
- (5) Nature of bed (mud, sand, or rock); of banks (high or low, stable or caving); of adjacent bottom lands (firm or swampy; apparent frequency of overflow). Also show presence of shoals, reefs, and rapids, if any.
- (6) Fords and limits of fordability, and limits of navigability.
- (7) Potability, contamination of various sorts, and sediment movement.
- (8) Tides and tidal currents if any. Use same data as in e(5) and (6) below.

b. *Lakes and Ponds.* For each important body of still water, give the information listed below or such of it as is appropriate. In an area of numerous small ponds, average or total figures may be given.

- (1) Name.
- (2) Drainage area.
- (3) Maximum and minimum outflows, both average annual and long-term.
- (4) Variations in surface elevations and depth, both average annual and long-term.
- (5) Ice conditions.
- (6) Nature of bottom and banks, and of adjacent land areas (low or high, well drained or not).
- (7) Potability and contamination.
- (8) Navigability.
- (9) Any general information of interest.

c. *Marshes and Swamps.* Give location, superficial area, and trafficability in different seasons and for various loads. State practicability of road construction using mats, piles, fill, or other suitable means, with particular reference to such conditions as bogs, quicksands, and permafrost.

d. *Ground Water.* Give normal level of water table and variations; yields of springs and wells, and variations (individually for

a small area, otherwise average conditions); potability and contamination; underground flow of dry water courses; and in an Arctic area, permafrost and allied phenomena such as icing.

e. Near-Shore Oceanography. Include the following:

- (1) Nature of shore between high and low water; materials (rock, cobbles, gravel, sand of various finenesses, or mud); gentle or steep slope; stability; and shoreline vegetation, such as mangroves.
- (2) Nature of immediate inshore area (inland from high water line): materials; slope; regular or irregular terrain; presence of dunes, marshes, tidal creeks, small ponds, or quicksand.
- (3) Trafficability for both (1) and (2) above.
- (4) Nature of immediate offshore area (out from low-water line): bottom material; slope; smooth or irregular bottom; close-in reefs, bars, sandbanks, or marine vegetation such as kelp.
- (5) Tides: variation (spring, neap, and average); periodicity; datum (whether mean low water (MLW), mean lower low water (MLLW), or other).
- (6) Tidal currents: location, direction, velocity, and periodicity. Tidal rips.
- (7) Surf conditions, average and extreme, both on the beach and on any offshore reefs and shoals; undertow, and relation of these to tidal phases, wind, weather, and seasons.
- (8) Practicability of approaching and landing through surf for small boats and landing craft of all sizes, taking into account (4), (5), (6), and (7) above.
- (9) For the mouth of an important stream, give data on tidal influence, distance inland it extends, variation and periodicity, and effects on potability of water and on navigation. Also give hydrography of harbor, bay, or estuary, including data on bars at mouth, if any.

83. Soils

Information should be presented on the items listed below. In the case of a large area in which soil conditions vary widely from place to place, the area may be reported on by sections or average conditions may be given.)

a. Classification according to grading (gravel, sand, silt, or clay); according to composition (adobe, blow sand, caliche, chalk, peat, etc.); and according to consistency (plastic or friable).

- b.* Special formations such as moraines and sand dunes.
- c.* Depth to rock.
- d.* Drainage characteristics.
- e.* Behavior when very wet; when very dry.
- f.* Trafficability for marching men and for various types and weights of vehicles.
- g.* Adequacy to support foundations (footing, pile, other), and as a subgrade for a road or railroad.
- h.* Availability of sand and gravel suitable for construction.
- i.* Ease or difficulty of entrenching and revetting.
- j.* Prevalence of dust storms.
- k.* Presence of substances which develop dangerous radioactivity after exposure to a low, surface, or underground nuclear burst.

84. Rock

The following data should be furnished :

- a.* Mineralogical classification (granite, basalt, schist, quartzite, marble, slate, sandstone, limestone, shale, conglomerate, and so on). In appropriate cases, give geological classification, also.
- b.* Depth below surface.
- c.* Extent and location of areas where rock is at or very close to surface.
- d.* Availability of rock suitable for construction work after crushing.

85. Vegetation

The following information should be furnished on vegetation:

- a.* Classification (trees, shrubs, grasses, or crops) with relevant information thereon.
- b.* Obstacles presented by vegetation to military movements and other military operations, including construction.
- c.* Suitability for natural concealment.
- d.* Growth cycle, and its effect on concealment and camouflage work at different seasons.
- e.* Flammability, either from natural causes or as a result of incendiary or nuclear bombing.
- f.* Lumbering possibilities.

86. Land Use

Data should be furnished on the use made of the area in general terms, including sections under cultivation, in pasture, lying fallow, being lumbered or otherwise exploited, or completely undeveloped.

For intelligence reports on works of man in more detail, see chapters 15 to 17.

87. Weather and Climate

The following information should be furnished on weather and climate:

a. Brief general description of prevailing weather for whatever period is to be covered by the report (annual or shorter term).

b. Expected temperatures and temperature variations for the period, including both the variations during a 24-hour day and the variations of the daily average.

c. Expected precipitation: rain or snow; total expected; frequency and intensity; probability of cloudbursts, blizzards, or droughts; and probable standing snow cover on level ground and in drifts.

d. Expected winds: direction and intensity (attach wind rose); duration; probability of hurricanes, typhoons, tornadoes, or dust storms.

e. Cloudiness: give data on any seasonal periods of protracted cloudiness.

f. Humidity.

g. Electrical disturbances, if important.

h. Effect of characteristic weather and atmospheric conditions on the transmission through the air of instantaneous nuclear and thermal radiation, the movement and concentration of contaminated clouds and dust, the spread of surface fires, and other phenomena connected with nuclear warfare and the use of ABC weapons and agents.

88. Other Geographic Features of Importance

Data should be furnished on any other natural geographic features of importance, such as caves, earthquakes, and volcanoes. For additional information on natural geographic features, see TM 5-545.

CHAPTER 15

LINES OF COMMUNICATION

89. Roads

The following data should be furnished :

- a.* Name or route number, if any.
- b.* Location, including terminals and intermediate localities which the road serves.
- c.* Length of each stretch.
- d.* Usable width.
- e.* General condition.
- f.* Obstructions, such as craters, roadblocks, mines, destroyed culverts and bridges, grades in excess of 6 percent, and curves whose radii are less than 150 feet.
- g.* Defiles and bottlenecks, and possible bypasses.
- h.* Overhead clearances.
- i.* Estimated traffic capacity and load capacity, including running times.
- j.* Extent to which the capacity of the road is needed for normal civilian traffic, and for civilian traffic deemed essential under theater policies.
- k.* Type of wearing surface and subgrade.
- l.* Drainage provisions and structures and their adequacy.
- m.* Data needed for any major repairs or extensions.
- n.* Visibility to enemy ground observers.
- o.* Vulnerability to nuclear weapons.

90. Bridges

The following information should be furnished on bridges :

- a.* Location and structural type, and name of stream if known.
- b.* Class (FM 5-36 and TM 5-260).
- c.* Lanes : number and width.
- d.* General condition.
- e.* Spans : number, length, and length of panels.
- f.* Abutments : type, material, and dimensions.

g. Intermediate supports: type, material, number, location, spacing, and sizes and placement of members.

h. Stringers: number per span, type, material, size, and spacing.

i. Flooring: type, material, thickness, number of layers (for plank floor), and thickness and direction of each layer.

j. For truss, arch, girder, or suspension bridges: type, material, structural details including connections, and dimensions of principal members.

k. For drawbridges: character and dimensions; clear width(s) (allowing for fenders) for navigation of drawspan; for lift spans, clear height when raised (specify stage of river); details of operating machinery if any; practicability of hand operation; time required to open and close, by machinery and by hand; how frequently the span is normally opened; how frequently it must be opened to handle water traffic deemed essential under theater policies; and availability of trained and trustworthy operators.

l. Physical condition of foregoing structures and apparatus.

m. Approaches.

n. Vulnerability of bridge to flood or ice damage, including possible flanking of abutments by erosion.

o. Data needed for major repairs or improvements.

p. Type of soil in stream or gap; in abutments.

q. Vulnerability to nuclear weapons.

r. Safety and security features.

s. Bypass conditions.

91. Railroads

The following information should be furnished on railroads:

a. Name.

b. Terminals, intermediate stations, and length of each stretch.

c. Obstructions (demolitions, washouts, and blocked tunnels).

d. Gage.

e. Number of tracks.

f. Weight and type of rails.

g. Grades and curve radii (degree of curve).

h. Ties, ballast, and roadbed.

i. Sidings and passing tracks: locations, lengths, and switches.

j. Tunnels: locations, clearances, portal structures, and linings.

k. Overhead structures and vertical clearances.

l. Drainage facilities, including culverts.

m. Bridge data (generally similar to par. 90).

n. Operating and repair facilities. Data needed will vary with the situation, and in some cases may be quite detailed. Transportation Corps cooperation may be desirable. The *general* heads are—

- (1) Loading and unloading facilities for men, goods, and vehicles, including data on freight and passenger depots.
- (2) Fueling, watering, and icing facilities; stocks of fuel on hand; and source of fuel.
- (3) Yards.
- (4) Administrative, servicing, and repair facilities, including but not restricted to the following: offices; round-houses; turntables; shops; mobile wrecking, repair, and other equipment; and stocks of repair parts, structural materials, and supplies.
- (5) Signal, traffic control, and dispatching facilities.

o. Rolling stock, with full details.

p. Physical condition of the above installations and apparatus.

g. Data needed for any major repairs or other tasks which are engineer responsibilities.

r. Availability of trained and dependable personnel.

s. Vulnerability to nuclear weapons.

t. Safety and security features.

92. Navigable Waterways

The following data may be needed either for the waterway as a whole, or for separate stretches, if navigation conditions vary widely. In the case of rivers they may be supplemented by the data in paragraph 82.

a. Name, location, and nature (harbor channel, open river, canalized river, canal, or lake).

b. Names of terminal and intermediate ports, and length of each stretch.

c. Obstructions, such as lock demolitions and wrecks sunk in the channel.

d. Channel (attach charts) :

- (1) Depth, bottom width, and current velocity, and variations of these with various stages and seasons, and with tides, if any. If a certain controlling depth obtains, except for one or a few critical shoals or except at critical seasons, give details.
- (2) Critical bends: location, radius, and visibility.
- (3) Aids to navigation: buoys, including bell buoys; lights; range marks; radar; and foghorns.

e. For open rivers: regulation works, if any (location, description, and adequacy), and a statement of whether, and to what extent, maintenance dredging has been necessary in the past.

f. For canals, in addition to *e* above: data on locks, including name, location, lifts, inside dimensions of chamber(s), depth over sill, type of gates, time to fill, empty, and transit the lock, nature of operating machinery, availability of repair parts and of assemblies such as spare gates, emergency closure apparatus, aids to navigation at lock, approaches and approach structures, and availability of trained and trustworthy operating personnel.

g. For canalized rivers, in addition to *e* and *f* above: data on dams as per paragraph 101.

h. For all rivers and canals: adequacy of natural water supply, facilities for augmenting it in dry seasons, such as storage reservoirs.

i. Bridges over waterway: relevant data from paragraph 90 and any additional navigation data needed, including vertical clearances.

j. Fords.

k. Special features, such as a canal which passes over a bridge or through a tunnel.

l. Port and transshipment facilities (par. 95).

m. Ships, boats including towboats, and barges which operate regularly on the waterway. If detailed data are needed, Transportation Corps cooperation may be desirable.

n. Floating plant (including dredges), and other heavy machinery, yards, construction materials, and the like, which are available for maintaining and improving the channel and its navigation structures and installations. Indicate available dumping areas for dredged material. State the availability of trained and dependable personnel.

o. Physical condition of the above installations and apparatus.

p. Data needed for any major repairs or improvements.

q. Vulnerability to nuclear weapons.

r. Safety and security features.

93. Pipelines

The following information should be furnished on pipelines:

a. Name if any; material transported.

b. Terminal, route, and length of line and of sections.

c. Number and diameter of pipes; delivery capacity of system, at present and under normal conditions, in gallons or barrels (or

for gas, thousands of cubic feet) per day; and content of pipeline when full.

d. Facilities at receiving end. If this is a port and if reception is from tanker or tank barge, give data on connections from ship to shore (wharf if any, flexible connections, and method of hooking up and disconnecting).

e. Storage at receiving end and along pipeline. This should include location, nature, and capacity of individual storage units, and total storage at each location.

f. Critical points, such as swamps and defiles, along the pipeline.

g. Types of support and connections along the pipeline.

h. Pumping stations: location, capacity, and detailed data on equipment.

i. Vulnerability to nuclear weapons.

j. Administrative, maintenance, and repair facilities, including shops.

k. Security and safety features.

l. Physical condition of the above installations and apparatus.

m. Data needed for any major repairs or improvements.

n. Availability of trained and trustworthy personnel.

94. Airfields

The following information should be furnished on airfields (part 4, TM 5-250) :

a. Location, and name if any.

b. Category: emergency landing strip, refueling and rearming strip, advanced landing ground, fighter field, bomber field, photo-reconnaissance field, troop-carrier field, supply and evacuation field, headquarters field, or occupational field (alternatively: forward cargo, forward tactical, medium bomber, or heavy bomber). In addition to the above, there are air bases and air depots, not normally installed by our forces in a theater, and airstrips for liaison aircraft. A foreign airfield may not fit precisely into any of these USAF categories.

c. Standards:

(1) Operational standard (full operational, minimum operational, or emergency).

(2) Housing and administrative standard (permanent, temporary, intermediate, or field).

d. Flightway:

(1) Runways: orientation, dimensions, angle of axis to pre-

vailing winds, type of construction, thickness of slab, regularity of surface, visibility conditions, adequacy of drainage, and suitability for jet operation.

- (2) Approaches: flare angle; glide angle; brief statement of surface topographical features and military installations within approach zone; and other remarks on approach conditions, especially as they are affected by weather conditions, including prevailing winds.

- (3) Shoulders: materials, dimensions, and surfaces.

e. Hardstands and taxiways: location, dimensions, surface, revetments, and amount of parking which is integral with runway.

f. Warmup aprons: location, dimensions, and surface.

g. Operational facilities: control tower and equipment, operation and briefing rooms, and other.

h. Fuel storage: give amount, character, capacity, and location of containers. Describe dispensing system, including capacity and the number and location of outlets.

i. Ammunition and other storage.

j. Repair and maintenance facilities.

k. Housekeeping facilities: offices, living quarters, messing and recreational facilities, utilities including fire-fighting, roads and walkways, road and railroad connections, communications, and other.

l. Camouflage: airfield as a whole, runways, hardstands, fuel and ammunition storage, and other.

m. Physical condition of the above installations and apparatus.

n. Vulnerability to nuclear weapons.

o. Safety and security features.

95. Ports

A port, in addition to its waterfront installations, is usually part of a city whose population and resources are important to the military use of the port. Also, the neighboring area may become the location of base depots, cantonments, and the like. For complete planning of port activities, intelligence reports will be needed therefore on the city and the adjacent terrain. The checklist below does not cover this field but is confined to port facilities as such. For this purpose, the following information will be needed:

a. *Name and Location.* State name and location.

b. *Hydrographic Category.* Describe it as an open roadstead, partly inclosed bay, landlocked harbor, sheltered area behind barrier reef, estuary, river, canal, or lake. (Not all the following in-

formation is appropriate to all these cases.) Give a general statement on how well the port is protected by nature from winds and waves from various quarters. Describe breakwaters and jetties in full detail.

c. Approach Channel. Attach charts, and give data on the following:

- (1) Outer bar if any: location, depth, and bottom width of bar channel, tendency to shift and shoal, wind and wave conditions, and aids to navigation.
- (2) Inner channel: data called for in paragraph 92 as far as appropriate.
- (3) Equipment locally available for channel maintenance and improvement.
- (4) Ice conditions.
- (5) Tides: data called for in paragraph 82. If tidal conditions vary in different sections of the approach channel, give data for each major section. If arriving and departing ships must "work the tides" in a certain manner and timing, explain in sufficient detail. State what stage is used as a datum in recording depths elsewhere in the report.
- (6) (For river ports.) Currents and stages, with seasonal variations.

d. Open Anchorage. State the location; area; approach channels; depth; capacity for ships of various sizes; wind, wave, and current conditions; nature of bottom; and mooring installations if any.

e. Artificial Basins. Give location, purpose (mooring, loading and unloading, or drydocking and repair), area, and approach conditions. If there are locks, give data called for in paragraph 92.

f. Wharves.

- (1) Category: pier or quay, fixed or floating.
- (2) Purpose: general cargo, special cargo (state kind), or passengers.
- (3) Structural features, including type, materials, deck area, bearing power of deck, and height above high water.
- (4) Structures on wharf (*h* and *i* below). If none, state "open wharf."
- (5) Aprons: location and width.
- (6) Cargo handling machinery, with capacity.
- (7) Road and railroad connections on wharf: running tracks and standing tracks, with location; roadways; turn-arounds; and parking areas.

(8) Berths: locations and dimensions.

(9) Mooring facilities, including dolphins.

g. Lighterage Facilities. State what lighterage facilities are available.

h. General Storage and Transit Structures. Describe general storage and transit structures on or close to the waterfront, including the following data:

(1) Location, with statement as to whether it is on a wharf.

(2) Purpose: classification (transit) shed, general storage, administration, or other.

(3) Structural data.

(4) Road and railroad approaches, and parking areas.

(5) Full information on capacity. In the case of a classification shed, give data on the tonnage that can be handled through it in a given time. Also give data on cargo handling machinery.

i. Special Handling and Storage Facilities. Describe handling and storage facilities for special cargoes, such as liquid fuel, explosives, ammunition, and perishables including cold storage.

j. Repair Facilities: Describe ship and other repair facilities.

k. Utilities. Describe utilities, including fire-fighting, and their adequacy.

l. Nuclear Vulnerability. Discuss vulnerability of port to nuclear weapons.

m. Physical Condition. Give physical condition of above installations and apparatus.

n. Capacity. Give capacity of port as a whole, under both normal and existing conditions.

o. Major Repairs. Provide data needed for major repairs or improvements, including information on vacant areas available for expansion.

p. Security and Safety. Describe security and safety features, with special attention to storage and handling of explosives and liquid fuel.

q. Personnel. State availability of trained and dependable personnel, especially pilots.

96. Other Means of Communication

Appropriate data should be furnished on other means of communication, such as cableways, tramways, and ferries.

CHAPTER 16

OTHER CULTURAL FEATURES

97. General

This chapter deals with a wide variety of structures and installations, often containing complex machinery and used for specialized operations. The checklists which follow are general in character; and there are many secondary cultural features, not listed here, which may affect military operations. If further details are needed in any particular case, as for example the functioning of an industrial plant, the intelligence agency may require specialized assistance for collection and interpretation.

98. Urban Areas: General

This paragraph deals with the features of urban areas, other than utilities, *from the viewpoint of engineer intelligence*. (In a theater of operations there are many other facts about urban areas which are of importance to the agencies of civil affairs/military government, to military intelligence, and to technical services other than the Corps of Engineers.) The following information should be furnished:

a. Name, location, boundaries, area, and normal and present population.

b. Streets and roads:

- (1) General pattern, with special attention to main and through streets.
- (2) For important streets give the following data: nature, bearing capacity, and type of wearing surface and sub-grade, with pertinent construction details. State traffic-ability when in repair, mechanical traffic control, natural obstructions to free movement of traffic (bad paving, narrow streets, sharp turns, excessive grades, mud, and standing water), and temporary obstructions (roadblocks, shellholes, and collapsed structures).
- (3) Bridges (par. 90).
- (4) Physical condition of the above and data needed for major repairs or improvements.

c. Engineer facilities and equipment (pars. 113 and 114) :

- (1) Plants for the manufacture, processing, or repair of materials or equipment of interest to engineers.
- (2) Fleets or stocks of construction equipment, as in contractors' yards.
- (3) Stocks of engineer construction and other materials, including wholesale and retail stores and warehouses (character, amount, condition, and location).
- (4) Facilities for drafting, lithographing, photostating, blueprinting, and map reproduction.

d. Buildings, especially large public or other structures suitable for military purposes (par. 99).

e. Vulnerability to nuclear weapons.

99. Buildings

The following information should be given on buildings :

a. Location and purpose. State whether single residence; apartment; hotel; retail or wholesale shop; storage; industrial; office; military or other public or quasi-public (including cultural and religious) ; or other.

b. Structural data. State materials, foundations, if known, wall design, roof design, interior support system, bearing capacity of floors, data on windows and exterior doors, and other details as needed.

c. Layout and capacity, including floor plans, areas, and cubages.

d. Utilities, including fire protection.

e. Other special installations and facilities.

f. Military use(s) to which building could be put, with full details.

g. Security and safety features, including strength of building to resist bombing, shelling, and nuclear weapons.

h. Data needed for any major repairs or improvements, including conversion to any specified military use.

100. Utilities

Information should be furnished as indicated below.

a. *General.*

- (1) The following checklists were prepared primarily for urban utilities, but may be used for utility installations in the open country, such as hydropower plants.

- (2) *For all utilities reported on, in addition to the data on the checklists, the following should be included:* physical condition; adequacy to normal load, both under normal conditions and at present; fraction of present capacity which could be diverted to military use; repairs essential for military purposes; vulnerability to nuclear weapons; safety and security features; availability of skilled and dependable personnel; data on administrative offices; and general comments on efficiency and dependability of system.

b. Water Supply.

- (1) Area, population, and installations served.
- (2) Source: stream, lake, deep or shallow well, collected rain-water, or distilled sea water. Also furnish data on adequacy of source and on seasonal fluctuations.
- (3) Character of raw water as to suspended sediment, suspended vegetable matter, dissolved minerals, and human and industrial wastes.
- (4) Delivery of raw water: describe dam (par. 101), diversion works, delivery conduit, pumping if any, and raw water storage at source (including storage dam) and at treatment area.
- (5) Treatment of raw water, including settlement, filtration, aeration, and chemical treatment, with details of plants and operations. Also give output of treated water in gallons per day (gpd), purity and potability of product, and storage facilities for treated water.
- (6) Delivery to consumers. In a large civilized community this involves a complex system of mains, pumping stations, supplementary treatment plants, reservoirs, storage tanks, and accessories such as laboratories, shops, and warehouses.
- (7) Capacity of system in gallons per day of purified water under normal and present conditions.

c. Sewage Disposal.

- (1) Area, population, and installations served.
- (2) If storm sewage is handled separately from domestic and industrial sewage, discuss the storm sewage system separately.
- (3) Delivery of raw sewage to point of treatment or discharge, including the layout, type of construction, and capacity of mains, and data on pumping plant, if any.

- (4) For treated sewage: location of treatment plant, nature of treatment, equipment with details, capacity, and end products. Describe the disposal of sludge and the purity and means of disposal of effluent.
- (5) For either raw sewage or effluent which is discharged into a body of water, give details of the resultant contamination, including its intensity and extent.

d. *Electric Power.* For each generating station give the following data:

- (1) How power is generated (water, steam, diesel, nuclear, or other); source and kind of fuel, storage facilities, and stocks on hand; nature and characteristics of boilers and prime movers; nature and characteristics of generators; auxiliary apparatus such as feed pumps, condensers, and economizers; source, amount, and adequacy of condensing water; transformer system at generating station; average and peak output in kilowatts (KW) or kilovolt amperes (KVA); and load factor, both under normal conditions and at present. For a nuclear station, describe briefly the reactor (including nature of fissionable material and moderator), cooling system, heat transfer system, method of disposal of toxic wastes, safety precautions, and any unusual hazards either to operating personnel or to the station itself and its environs. For a hydro station, give seasonal fluctuations in peak capacity based on variations in stream flow.
- (2) Transmission system: transmission lines above and below ground, voltages, transformer station, auxiliary apparatus, and any special features such as rotary converters.
- (3) Ties to system from any outside source of power.
- (4) Normal and peak capacity of system as a whole. Give seasonal fluctuations, allowing for amount of power that can be counted on from outside sources.

e. *Illuminating Gas.*

- (1) Source. If from outside, state the original source and the route, size, and characteristics of the pipeline (par. 93). If locally generated, describe the generating station or stations, including data on fuel.
- (2) Distribution, including mains, tanks, interconnections, and control apparatus.
- (3) Auxiliary installations.
- (4) Normal and present output, and quality.

f. Public Transportation System. Describe nature, routes, area served, equipment available, operating schedules, capacity in passengers, source, and amount of power used.

g. Communications.

- (1) State whether telephone, telegraph, or radio. (Make a separate report on each.)
- (2) Give description of system, including important structures and apparatus. For a radio station give location of tower, power, and range. For a telephone system give name, subscribers served, central building and exchanges, apparatus therein, extent of automation if any, source of power, location of principal cables, and auxiliary features, and attach copy of latest telephone directory.

h. Fire Protection. Give general description of system; location and description of stations; amount, nature, characteristics, and normal locations of fire-fighting apparatus and hydrants; adequacy of water supply, including pressures in various parts of protected area; fire alarm and communications systems; and recent history of area with respect to disastrous fires, especially those not caused by acts of war.

i. Trash and Garbage Disposal. Furnish general description of system; collecting and street-cleaning apparatus, including where housed, operating schedules, areas served and how often; and disposition of trash and garbage (incinerators with details, burning in the open, sanitary fills, dumping on land or in water, or use of garbage to fatten pigs).

101. Hydraulic Structures

The following information should be furnished on hydraulic structures:

a. General. For locks, see paragraph 92. For water-supply and sewage-disposal installations and for the power-generating features of hydroelectric installations, see paragraph 100.

b. Dams.

- (1) Location and name.
- (2) Purpose: navigation, power, flood control, irrigation, water supply, other, or a combination.
- (3) Basic construction data: design type, materials, height above foundation and above riverbed, top width, and base width.
- (4) Other structural features: roadway, gates with mechanical details and discharge capacity, other spillway facilities.

ties, apron, and protection against drift (including drifting mines launched by the enemy) and ice (including frazil ice). If a power dam, describe penstocks and give their capacity. If a navigation dam, describe movable features if any. If a diversion dam, describe diversion works.

- (5) Pool: length, average width, maximum surface elevation with respect to top of dam; maximum drawdown under normal operating conditions; and capacities of pool in acre-feet over the operating range of surface elevations.
- (6) Physical condition of dam and accessories. State ability to withstand maximum and average floods, bearing in mind physical conditions of the installation, spillway capacity, and normal operating level of pool.
- (7) Vulnerability to nuclear weapon.
- (8) Data needed for major repairs and maintenance.
- (9) Security and safety features. Consider the possibility of enemy demolition by bombing or sabotage, and the probable resultant flood damage (with special reference to U. S. forces and installations in the theater).

c. Levees and Flood Walls.

- (1) Name if any, location, length, terminal points (levee closed on itself, or connecting at its ends to high ground or other levees), and area protected.
- (2) Type and materials of construction. Give typical cross sections.
- (3) Age, known or estimated.
- (4) Minimum and average heights above present water surface. Give best available estimate of height above ordinary and exceptional floods. State location of lowest point and of any weak points, *with reference to flood profile or river surface.*
- (5) Any evidence of failure or near failure in the past, such as: scour holes, eroded channels, recent alluvial deposits, or other flood damage which is inside the levee and known or believed to postdate its construction; sand boils, or traces of them, inside or on the levee; signs of recent levee reconstruction; and sandbagging or other indications of emergency flood fighting on the levee.
- (6) Depths to which the different sections of the protected area would be flooded if the levee failed in a high flood, and resultant damage.
- (7) Vulnerability to nuclear weapons.

- (8) Data needed for major repairs and maintenance.
- (9) Security and safety features.

102. Mining Operations

The term as used here covers all operations for the extraction of minerals from the earth, except pit and quarry operations. Information to be furnished includes—

- a. Location and name of facility.
- b. Products of operation. Give nature of mineral extracted; quality (raw material, partly refined, fully refined); quantity produced, both in a normal operating year and under present conditions; stocks on hand; and reserves underground.
- c. General nature of extraction operation. State whether by deep mining or solid or rock ore; shallow or strip mining; placer mining; petroleum or natural gas production; or special methods, such as the extraction of sulphur by melting in hot water.
- d. Details of layout and operation, including pits, shafts, galleries, wells, hand and mechanical labor involved, mining and handling machinery, above ground structures with plant and equipment, details of refining processes, storage of product, and transportation facilities for product from locality to consumer.
- e. Physical condition of the above installations and apparatus.
- f. Data needed for major repairs and maintenance.
- g. Vulnerability to nuclear weapons.
- h. Safety and security features.
- i. If product is of military significance, give availability of skilled and dependable labor; data needed for major repairs; possibility of increasing present output; and possibility of diverting all or part of present output to military use.

103. Pits and Quarries

Pits and quarries considered in this text refer to quarries suitable for producing crushed stone for construction work and to pits or other sources of sand and gravel. Information required includes—

- a. *Crushed Stone.* State location of quarry; type (hillside or subsurface); method of operations (single or multiple trench); nature of stone; daily capacity in uncrushed stone; capacity of crushing machinery in stone of various sizes; details of machinery, including drilling equipment; daily capacity of quarry in crushed stone, allowing for handling facilities; manner of loading; number of trucks that can be loaded at once; and access roads and turn-arounds.

b. Sand and Gravel. State location and nature of source; nature of raw material, how extracted (hand labor, land machinery, or dredging), how cleaned and sorted; daily capacity of various products as in *a* above; and loading facilities as in *a* above.

c. Nuclear Vulnerability. Describe vulnerability to nuclear weapons.

104. Other Cultural Features

Data should be furnished on other cultural features of interest to engineers.

CHAPTER 17

INDUSTRIAL FACILITIES

105. General

The checklists below are those appropriate to a large area. For further details on some of the topics, see pertinent paragraphs in the text.

106. Electric Power

Substantially the same data will be needed as for the electric power system of an urban area (par. 100). The generating and transmission systems for the entire area should be shown, with interconnections between them, and a statement given of how much power can be transferred by these connections, and what total blocks of power can be delivered to key areas, especially those with large military loads.

107. Construction

Refer to paragraph 113.

108. Manufacturing and Processing

Refer to paragraph 115.

109. Petroleum Resources

The following information should be furnished on petroleum resources:

a. Wells or other sources of raw materials such as coal or oil shale (par. 102). Give estimated proved reserves underground.

b. Refineries (par. 102). State the nature of the product, including the octane rating of the gasoline produced.

c. Storage: location, nature, capacity, and present content of tank farms, of individual tanks, and of other forms of storage, including amount presently in pipelines. Stocks which are located at, or earmarked for the use of, utility, industrial, and other plants whose operation is deemed essential under theater policies (including essential civilian transportation) should be separately listed and clearly identified.

d. Pipelines and distributing systems (par. 93).

e. Availability of trained and trustworthy personnel.

- f.* Vulnerability to nuclear weapons.
- g.* Other appropriate data.

110. Coal, Lignite, and Peat

The following information should be furnished :

- a.* Mines or cuttings in area (par. 102).
- b.* Stocks in area.

111. Other Data and Topics to be Included

a. For other mineral resources, give data as in paragraphs 102 and 103. Also give stocks on hand in the area.

b. Include any other topics, of interest to engineers, in the general category of industrial facilities.

CHAPTER 18

MILITARY FACTORS

112. General

The categories of engineer intelligence considered in chapters 14 to 17, while their ultimate aim is utilization for military purposes, deal directly with natural objects or with works of man created for peacetime use. There are other categories that deal at first hand with military aspects. These include construction, defense, engineer materiel, engineer training, engineer operations, engineer organization, engineer logistics, key engineer personalities, and certain facts concerning the population of the nation under study. The topics to be considered are summarized below; for further details, see EIG 1. (EIG 1 may be obtained by engineer units by direct request to Engineer Intelligence Division, OCE.)

113. Military and Civilian Construction

The following data should be given for each of the major categories of construction projects which are of interest to the Corps of Engineers, including roads, railroads, inland waterways, pipelines, ports and port facilities, public utilities, dams, irrigation projects, flood control works, airfields, military installations, underground installations, and air-raid shelters:

a. *Military Construction, General.* Set forth the construction doctrine of the nation's armed forces, the division of responsibility for military construction among their different elements, and the types and amounts of construction that the military forces require. Cover any new methods, techniques, and procedures in use, and any investigations, research, and experiments completed or in progress in this field.

b. *Civilian Construction, General.* Give the standards and codes in use. State the division of responsibility for civilian construction among various governmental and commercial agencies. Discuss the needs of the country for different types of construction; the state of development of the construction industry; its ability to meet the needs of the civilian economy and to support a war effort; any unusual methods and techniques which are practiced; and any special problems which must be solved.

c. Construction Operations.

- (1) Discuss the functions, responsibilities, nature, size, and capacity of military organizations and other government agencies concerned with construction; the equivalents in private agencies; and the capabilities of both categories of agency to support military operations.
- (2) Give official civilian and military design standards and specifications, and construction standards.
- (3) Discuss construction methods in the fields of siting, clearing, drainage, earth moving, construction of subgrades and surfaces, building of structures, maintenance and repair, and the use of expedients, including hasty or temporary construction, the use of prefabricated elements, and the use of snow and ice.
- (4) Discuss the amount and quality of available labor. State to what extent the nation under study must depend upon foreign labor.
- (5) Discuss any special problems and the techniques adopted for solving them.
- (6) Give the following data for military, other governmental, and private organizations, engaged in research and development: name, location, facilities, types of projects, capabilities, and any indications of foreign influences or assistance.

114. Defenses

a. Considerations in the Scheme of Defense. Discuss the strength and effectiveness of the nation's armed forces; any treaty limitations thereon; the nation's economic capability to implement its defense; key centers of population and of political, industrial, or commercial activity; the extent and topography of the frontier, probable routes of invasion, and historical precedents.

b. Doctrine. State the current doctrine for national defense, including utilization of the terrain, defensive zones, how they are organized in depth, whether they have normal or extended front, and whether and to what extent they are separated into defensive belts. Discuss flank security, mutually supporting positions, the combined use of permanent and field fortifications, OP's, CP's, communications, fire control, the use of dummy or alternate emplacements, obstacles, cover, concealment, and provisions for counterattack. Set forth the present trends in defense doctrine.

c. Undefended Areas. Give the location and extent of any undefended border and coastal areas, and explain why they lack defenses.

d. Standard Types of Fortifications. Give data on all standard types set forth in official publications, including general and detailed description, standard plans and dimensions, construction methods and techniques, and the materials, tools, labor, and time required for construction.

e. Existing Fortified Areas. For each, give its location and purpose; a general description of the defenses in the area, their condition, and their present state of development; size and amount of armament; manning; and probable effectiveness.

f. Existing Individual Fortifications. For each, state its location, type, purpose, design, and construction details including provisions for ABC warfare. Describe the terrain. State the location of the fortification with respect to nearby positions and to natural and artificial obstacles. Give data on physical condition, construction materials, dimensions, troop capacity, communications, camouflage, underground works, armament, fire-control systems, mechanical equipment, utilities, communication system, and signal equipment.

g. Degree of Protection. State the degree of protection which the fortified areas and individual fortifications provide against both conventional and nuclear weapons.

115. Engineer Materiel

a. Research and Development. Give the following data on research and development in the field of engineer materiel:

- (1) Overall capabilities of the nation, including economic level to support a research and development program, levels of scientific achievement and of scientific education and training, and development trends.
- (2) The government's attitude in this field, including the extent of its influence over controlling or advisory agencies, and any government sponsorship or subsidy of research and development projects.
- (3) A comparison between military and civilian research and development.
- (4) Information on controlling, supervisory, and coordinating agencies for military research and development components. Give name, location, functions, areas of responsibility, key personnel, and the effectiveness of the organization. Separately, give similar data for civilian governmental components, and for nongovernmental research and development.
- (5) Information on installations engaged in research and

development activities, including name, location, ownership (government or private), foreign affiliations, type of research, facilities and equipment, key personnel, and full data on development projects.

b. Economic Factors. Give the following data on production of engineer materiel:

- (1) Overall economic data, including general level of economic development; availability of raw materials and of an industrial labor supply; extent of industrialization (cover the degree of centralization or dispersion, with special reference to self-sufficiency for raw materials and parts supply, and give data on the most heavily industrialized centers); total annual production of engineer materiel by category; degree of foreign financial or technical aid; production policy; exports and imports; stocks on hand; and any indications of strategic stockpiling.
- (2) Information on agencies responsible for the administration of production and trade; on manufacturers' syndicates or associations, whether or not under government control; and on the extent of foreign influence or control.
- (3) Data on industrial plants, including name, location, description, ownership, information on any associated plants, and a production analysis. The latter should cover sources of raw materials, labor force (including key personnel), capacity and rate of production, proportion of engineer materiel to other items produced, production efficiency, and disposition of end items.
- (4) Markings and nameplate data.

c. Technical Considerations. For each category or type of engineer materiel being considered, give the data listed below. (For a list of the major categories of materiel in which the Corps of Engineers is interested, see EIG No. 1, chapter 21.)

- (1) Description of the item, including type, model, origin, purpose, quality, principal components, materials, weight, dimensions, power unit (or activating device, as in mines), mountings, attachments and accessories, and packaging or crating. Illustrations of the unit and of its important subassemblies should be furnished.
- (2) Performance, including rated and actual capacities, attrition factors, ruggedness, any operational or maintenance problems, adequacy or inadequacy, and a comparison in these respects with corresponding U. S. items.
- (3) Utilization, including how the item is set up and used, the time required for this, and transportability.

- (4) Standardization. Cover interchangeability of parts and subassemblies, and also any standardization based on international agreements.

116. Engineer Training

a. Individual Training. Describe basic individual engineer training, including how trainees are selected, emphasis on training, where it is given, the training program and cycle of training, the type, quality, and methods of instruction, details on individual courses, and the placement of trainees after they have completed their courses.

b. Unit Training. Give data on time allotted, principal subjects covered, and the character, quality, and adequacy of the training. Cover combined arms training, with data on specific exercises. State to what extent the training is consistent with assigned capabilities.

c. Engineer Schools and Training Centers. Data should be furnished for military institutions, and also for civilian educational institutions which give courses attended by military personnel, or a considerable number of whose graduates become engineer officers. For each institution give the name, location, mission, capacity, size, enrollment statistics, type and quality of instruction, key faculty personnel, curriculum, lengths of courses, organization, and educational facilities.

d. Engineer Training of Other Arms. Discuss the nature and extent of such training, the role of the engineers with regard to it, and the effect of the training on the overall engineer support given the nation's armed forces. In the study, emphasis should be on the combat arms.

e. Foreign Influence. Discuss the extent of foreign influence on engineer training. Give details of foreign missions which are concerned with the nation's engineer training, and of any military missions which the nation sends to other countries for the same purpose. Discuss the sending of engineer personnel to other countries for training.

f. Factors Affecting Training. Cover the existing status of engineer training; essential subjects; the time, equipment, facilities, and instructor personnel available; how the training is organized; and any obstacles that are encountered.

g. Civilian Training of Engineers and Related Scientific and Technical Professionals. Cover the types of schools which give such training, quality and methods of instruction, courses in detail, degree of emphasis on various courses, number of students by

profession, placement of graduates, and the institution's scholastic standing and reputation.

h. Civil Defense Training. The description should include training and operation in the fields of demolitions, fire fighting, and the construction of air-raid shelters.

117. Engineer Operations

Intelligence on engineer operations covers the field of engineer combat and service support of the ground forces. It deals, not only with the nation's military engineers, but with nonengineering elements of its ground forces having missions analogous to any of those of the Corps of Engineers. The following should be covered:

a. Combat Operations. Discuss the mission, duties, employment, and techniques of the engineers in all phases of combat, including reconnaissance; mine warfare; demolitions; troop movements; the offensive; the defensive; retrograde movements; attack on a fortified position; operations at river lines; night combat; combat in towns; combat in woods; combat in defiles; combat in snow and extreme cold; mountain, jungle, and desert operations; amphibious operations; and airborne operations.

b. Service Support Functions. Refer to paragraph 119.

c. Nuclear Operations. Describe the tactics, missions, duties, employment, and techniques used by engineers in nuclear demolitions and attacks. Discuss the effects of nuclear warfare on engineer activities in the fields of dispersion, camouflage, direct protection, and area damage control. State the extent of foreign influence on the nation's theory, training, and practice in this field.

118. Engineer Organization

a. Organization of the Ground Forces. Give the overall organization of the nation's ground forces. Topics to be covered include the commander of those forces; the organization of the top command corresponding to the U. S. Department of the Army, showing the position of the engineers therein; the strength and mobilization potential of the ground forces; and their organization into military administrative regions or districts, and into tactical units at various levels. Include organization charts of large units showing the position of the engineers therein.

b. Organization of the Engineers.

- (1) Cover the historical development of the engineer arm, classification of engineer troops, allotment of engineers to territorial and troop commands, and their strength and capabilities.

- (2) Discuss the individual engineer soldier (officer, warrant officer, and enlisted man), covering the topics of uniform, insignia, decorations, term of service, pay, general quality, technical training, capabilities, morale, rotation of duties, assignments, and career incentives.
- (3) Discuss the organization, strength, and functions of engineer headquarters and staffs at various levels, and the organization of the top ground forces command for functions which are performed by the U. S. Corps of Engineers but not by the engineer arm of the ground forces under study.
- (4) Give TOE data on each type engineer unit, and on other units having functions like those of the U. S. Corps of Engineers. For each unit give its designation, strength, mission, assignment, capabilities, mobility, basis of allocation, and data on engineer equipment, weapons, and transportation. Attach an organization chart for each type of unit.
- (5) With respect to engineer headquarters and units that have been individually identified, give numerical designation and type, subordination, location, date last identified, actual strength and major items of equipment, components, identity of the commanding officer, and current mission, activities, and capabilities.
- (6) Give data on permanent mapping installations within the territorial organization, including name, location, identity of commanding officer, organization, and ability to meet the needs of the nation's ground forces.

c. Paramilitary and Civilian Units. With respect to paramilitary labor or pioneer groups, give name and type of organization, top command or control, relationship to the engineer arm of the ground forces, details of organization, location of offices and of work areas, key personnel, number and technical quality of personnel, equipment and transport, present activities, and an analysis of the potential value to military engineering. Give similar data on premilitary youth organizations which are in training on works of military engineer value. Discuss professional engineer societies, covering their name, size, purpose, and professional and political standing, and giving the location of their headquarters. Describe the national and regional organizations for civil defense.

119. Engineer Logistics

The following should be covered:

- a. Engineer Logistical Functions.* Describe the position of the

engineers within the overall logistical organization of the ground forces.

b. Supply. State the supply responsibilities of engineer staffs at each command level. Explain the requisition channels and procurement procedures for engineer materiel. Describe the organization of the depots, dumps, and supply points through which engineer materiel flows, and its distribution to the user, from the point where the military assumes physical control of it. Discuss the characteristics of the permanent engineer supply depots within the territorial organization, including name, location, classification, size, organization, commanding officer, facilities, nature and amount of equipment handled, and number of personnel.

c. Transportation. State what agencies are responsible for transporting engineer supplies from the Zone of Interior to division level; for transporting bulk liquids in a theater of operations via military pipeline systems; and for operating and maintaining such pipeline systems.

d. Maintenance. Discuss engineer technical supervision of the maintenance of engineer equipment, and the procedures for recovering disabled or abandoned engineer material, both enemy and friendly.

e. Service Support. Give the organization and functions of the agencies responsible for the following: military construction, including base development; reconstruction and rehabilitation; the acquisition and disposition of real estate; the quartering of personnel and headquarters; POL production and processing; the operation and maintenance of utilities, including water supply; firefighting; camouflage; and beach operations.

120. Engineer Who's Who

a. Give the following information on enemy engineer officers holding staff or command positions down to the level of battalion commander; and also those commanding independent units smaller than a battalion: name, aliases, and sex; place and date of birth; education and special qualifications; languages other than his or her own; rank or title; present position; political and professional affiliations; accomplishments; personality, character, and loyalties; and family and family ties. Attach a photograph of the individual.

b. Give the same information on the following categories of personnel:

- (1) Other military officers who hold positions corresponding to any of those held by engineer officers of the U. S. Army,

or who for other reasons are of interest to the Corps of Engineers.

- (2) Officers who, by their position, experience, and/or accomplishments, have an actual or potential influence in matters of interest to the military engineers, including those who control civilian engineer activities.
- (3) Professional engineers whose activities are of potential military engineer value.
- (4) Technical personnel, such as geologists, geographers, surveyors, architects, foresters, and scientists, whose activities are closely allied to military engineering.
- (5) Key trade personnel and artisans.

121. Enemy Population

Data on the enemy population as such, including its behavior patterns, governmental system, education and training, ethical standards, civilian organizations, and peacetime activities, as well as the personalities of its leaders, are highly important to our armed forces. Intelligence in these fields is included in that produced by the Chief of Engineers and agencies at Department of the Army level. At lower levels, and especially below theater army, it does not belong to the category of engineer intelligence as such, being primarily strategic in character. However, such intelligence is often of interest and value to engineer troops and staffs.

PART SIX

ENGINEER INTELLIGENCE PERSONNEL AND TRAINING

CHAPTER 19

ENGINEER INTELLIGENCE UNITS

122. Units and Personnel

Excluding topographic troops, the units concerned are the ETID(C), ETID(R), and ETD. For their missions and personnel, see TOE 5-500C.

123. Individual Training, ETID(C) and ETID(R)

a. General.

- (1) Basic combat training is received by the individual before he joins the unit. Training of individuals in their MOS requirements should, when practicable, be conducted or initiated in the appropriate service schools.
- (2) While the two types of ETID have somewhat different functions in a theater (par. 20), their missions as set forth in TOE's are much the same, and each team, if necessary, must be able to perform the basic functions of the other. (An exception is the technical translation function of the ETID(R).) Therefore, their schedules of individual and unit training, in general, will be quite similar.

b. Branch Advanced Individual Training. This does not differ fundamentally from that given to other engineer personnel serving with troop units. However, the nature and extent of the training and the emphasis on certain topics are modified, because the units are quite small, their duties are specialized, and normally they do not enter organized combat or perform certain functions (such as construction) which occupy much of the time of the average engineer unit. The following is a suggested list (not in order of presentation) of topics to be taught:

- (1) Character guidance (integrated into all training).
- (2) Troop Information (integrated into all training).

- (3) Physical training, including physical-fitness tests.
- (4) Mechanics of weapons and marksmanship firing.
- (5) First aid; safety; survival training.
- (6) Defense against nuclear attack.
- (7) Engineer handtools.
- (8) Rigging, with emphasis on the handling of heavy weights under field conditions.
- (9) Care and maintenance of equipment.
- (10) Driver training.
- (11) Reconnaissance.
- (12) Explosives and demolitions.
- (13) Mine warfare, with emphasis on the removal or neutralization of mines and on all aspects of boobytrapping.
- (14) Concealment and camouflage.
- (15) Fire fighting.
- (16) Security of engineer installations and work parties, with emphasis on the security of a small detachment in a forward area.
- (17) Engineer organization, with emphasis on those aspects which affect the functioning of ETID's in peace and war.
- (18) Methods of instruction, with emphasis on teaching personnel how to instruct others in the design and functioning of mechanical equipment and devices, including mines.
- (19) Safeguarding of military information, with emphasis on its importance.
- (20) Necessary proficiency tests.
- (21) Other topics which may be added if time permits include unit administration and supply, military justice, dismounted drills and ceremonies, psychological warfare, rules of land warfare, signal communications, maps and mapping, and supply economy.
- (22) Military courtesy is to be emphasized at all stages of training.

c. *Specialist Advanced Individual Training.* The following is a suggested list of topics to be taught (not in order of presentation), with study references and training aids. In adapting it to any particular unit, broad discretion should be allowed the unit commander, who must consider the situation and the specific mission of his unit.

Topic	Study references	Training aids
Introduction to intelligence; basic principles; definitions; ETID mission and historical background.	(C) FM 30-16	
U. S. intelligence organization in peace and war.	FM 30-5 (C) FM 30-16 FM 30-19	
Basic intelligence doctrine; sources, the intelligence cycle, techniques of collection, uses of intelligence.	AR 380-5 FM 11-30 FM 27-10 FM 30-5 (C) FM 30-16 (O) FM 33-5	
Mechanics of intelligence, including the interpretation of documents, target data, technical interrogatories, markings (types, location, identification).	FM 30-5 (C) FM 30-16 FM 30-19	
Intelligence report writing. This topic should be emphasized. Operations of field army, corps, and divisional units.	(O) FM 100-5 (O) FM 101-5	
Photography, including elements of aerial recognition, photointerpretation, and use of stereoscope with aerial photographs.	FM 11-40 TM 11-404	
Terrain studies (elements).		
Civil affairs military government, including basic principles, CAMG units, and methods of operation.	FM 27-5 FM 41-10 FM 41-15	
Reproduction methods and facilities-----	TM 5-231 TM 5-245	
Fundamental principles of engineer equipment, including that used for construction work of all sorts, lumbering, quarrying, earth moving, the handling and transportation of goods and materials, obstacles, water purification and supply, other utilities, surveying and topography, demolitions, mine detection, and infrared apparatus. This topic should be emphasized.	TM 5-252 TM 5-278 TM 5-295 TM 5-9431	
Foreign engineer equipment and material: familiarization with types; characteristics; capabilities and limitations; ability to recognize salient features and evaluate equipment. This topic should be emphasized.	DA Pam 30-5, 30-18, 30-19, and 30-20- series.	
Foreign camouflage, including decoys.		
Foreign fortifications and other installations.		
Foreign construction techniques.		
Foreign obstacles-----	TM 5-220	

Topic	Study references	Training aids
Foreign mines and demolition techniques. Emphasis on mines, their construction, functioning, removal, and neutralization.	FM 5-25 TM 5-223	GTA 5-19 GTA 5-20 GTA 5-22 GTA 5-24 GTA 5-25 GTA 5-26 FB 5-138 FB 5-140 FB 5-186 FB 5-199 FS 5-68 FS 5-134
Foreign military bridges and stream-crossing equipment. Foreign military engineers: organization, strength, doctrines, equipment, training, capabilities and limitations.	DA Pam 30- 19-series.	

124. Individual Training, ETD

a. *General.* Same as paragraph 123a.

b. *Branch Advanced Individual Training.* In general, similar to that outlined in paragraph 123. Maps and mapping should be included and emphasized, as an introduction to more detailed instruction on terrain in the specialist training courses. There should be less emphasis on mines and mine warfare than in the ETID training.

c. *Specialist Advanced Individual Training.* The following is a suggested list of topics (not in order of presentation) with the same qualification as paragraph 123:

Topic	Study references	Training aids
Introduction to intelligence-----	FM 30-16	
U. S. intelligence organization in peace and war.	FM 30-5 FM 30-16 FM 30-19	
Basic intelligence doctrine-----	AR 380-5 FM 11-30 FM 27-10 FM 30-5 FM 30-16 FM 33-5	
Mechanics of technical intelligence-----	FM 30-5 FM 30-16 FM 30-19	
Intelligence report writing-----	FM 100-5	

Topic	Study references	Training aids
Photography	FM 101-5 FM 11-40 TM 11-404	
Reproduction methods and facilities	TM 5-231 TM 5-245	
Photo interpretation (more emphasis on the topic than in the suggested training program of an ETID, where it is combined with photography).	FM 21-26 (O) TM 30-245 TM 30-246	
Terrain studies. This is the major part of the program and may include instruction in the following topics:		
Landforms	FM 21-26	TF 5-1790 TF 5-1792 TF 7-1972
Drainage (streams, lakes, marshes and swamps, and canals and ditches).	FM 5-34 FM 5-132 FM 31-5 FM 31-60 FM 60-10 TM 5-545 (O) TM 30-245 TM 30-246	GTA 5-10-1 GTA 5-10-2
Water sources (springs, surface water, and ground water).	FM 31-60 FM 55-26 TM 5-245	
Vegetation	FM 5-20 FM 5-34	
Lithology and soils	FM 5-34 TM 5-545 (O) TM 30-245	
Special physical phenomena, including permafrost, glaciers, seismic and volcanic action.	TM 5-545 (O) TM 30-245	
Cross-country movement and trafficability, including consideration of cultural features affecting military movement, such as dikes, ditches, and hedgerows.	FM 5-15 FM 25-10 FM 31-70 TM 5-545 (O) TM 30-245 TM 30-246	
Coasts and landing beaches	FM 110-115	
Landing areas and drop zones	FM 57-20 FM 57-30	
Airfield sites	TM 5-250 TM 5-252 (O) TM 30-245	

d. Natural Resources and Works of Man. The subject includes the topics considered in chapters 14 to 17 of this manual. Since the coverage is so extensive, instruction will normally be of a general character, with special emphasis on features which have a bearing on the unit's present mission.

125. Unit Training

a. Unit training for both ETID's and ETD's should include—

- (1) Orientation instruction, covering the organization and capabilities of the unit; the unit's relation to other units and commands with which it is normally associated; and a summary of the duties and responsibilities of its personnel.
- (2) A continuation, on a unit basis, of training in all or most of the topics listed in paragraph 123*b*.
- (3) Training in the specialized technical duties of the unit. The field to be covered is that which was dealt with in the advanced specialist individual training (pars. 123*c* and 124*c*), but emphasis should be on the practical application, by the detachment's personnel functioning as a unit, of the knowledge acquired in individual training.

b. Much of the unit training of the detachments should be given in the field. This is especially important in the case of ETD's. Field training gives an opportunity for combining instruction in the unit's specialties and in topics covered during individual branch training, such as equipment maintenance, the use of tools and rigging, mines and boobytraps, concealment, camouflage, and security.

CHAPTER 20

OTHER ENGINEER INTELLIGENCE TRAINING

126. General

a. Engineer intelligence training other than that covered in chapter 19 includes—

- (1) Training of personnel for duty with the intelligence section of an engineer staff or command, and training of the section operating as a team.
- (2) Intelligence training given to other engineer personnel, as part of their regular individual and unit training.

b. At all levels, on-the-job training is emphasized for intelligence sections and personnel, regardless of what other training they receive.

127. Intelligence Personnel: Division Engineer Battalions

These are in the intelligence section of battalion headquarters, which produces intelligence for both division headquarters and the battalion (par. 18). For details of their training, see ATP 5-15 and MOS subject schedules. In summary:

a. The battalion S2 and assistant S2 will normally have received general instruction in intelligence subjects at The Engineer School. ATP 5-15 does not provide for training of any of the intelligence section personnel at service schools, except for part-time training of the photographer. It does not prescribe advanced individual specialist training within the unit except for the map distributor.

b. Accordingly, the training of the intelligence section and its personnel is a combination of individual and specialist training which may be given in special schools (conducted by the division G2 or by the corps or army engineer), and on-the-job training. The latter should cover the following, for the section as a whole and for its individual members in their respective capacities:

- (1) Determination of engineer EEI in actual or assumed situations (pars. 49 and 50).
- (2) Preparation of information collection plans (par. 51) for actual or assumed collecting agencies, including ground and air reconnaissance parties.

- (3) Processing of information into intelligence, and its prompt dissemination, as set forth in chapters 7 and 8.
- (4) Practice in the preparation, posting, and use of engineer intelligence journals, worksheets, and situation maps, and in the operation of intelligence files (ch. 7).
- (5) Practice in preparing routine and special intelligence reports (ch. 10) of the types appropriate to a combat battalion.

c. Some intelligence personnel have MOS numbers which are not of a specifically intelligence character. (Examples are the camouflage inspector, draftsman, photographer, and driver in the divisional battalion.) These receive their individual specialist training with similar MOS numbers assigned elsewhere in the battalion.

128. Other Personnel

For other personnel of engineer troop units intelligence training is as follows:

a. *Advanced Individual General Training.* This includes instruction in engineer intelligence and reconnaissance. In the case of a divisional engineer battalion, it covers the following: orientation; the doctrines and techniques of general and special reconnaissance; recognition of essential information; field expedient calculations of material quantities and preparation of work estimates; the planning and writing of reports; and the location and recording of items on maps and airphotos. Instruction should be integrated with that in map reading, fixed and floating bridges, roads, and airstrips. The following study references and training aids are appropriate:

<i>Study references</i>	<i>Training aids</i>
FM 5-6-----	TM 5-1676
FM 5-10-----	FS 5-54
FM 5-34-----	FS 5-55
FM 21-30-----	FS 6-61
	GTA 5-10-1
	GTA 5-10-2
	GTA 5-14

b. *Unit Training.* This includes instruction in map reading and in reconnaissance and control principles.

APPENDIX I

REFERENCES

1. Army Regulations (AR)

AR 117-5	Military Mapping and Surveying
AR 320-5	Dictionary of United States Army Terms
AR 320-50	Authorized Abbreviations
AR 380-5	Safeguarding Defense Information

2. Technical Bulletins (TB)

TB 5-240-2	Height Finder, Oblique Photograph, Photogrammetric
TB Sig 229	Field Expedients for Aerial Photography

3. Army Training Programs (ATP)

ATP 5-300	Engineer Combat Battalions
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4. Department of the Army Pamphlets (DA Pam)

(C) DA Pam 30-series	Foreign Military Weapons and Equipment (U)
DA Pam 108-1	Index of Army Motion Pictures, Film Strips, Slides, and Photo-Recordings
DA Pam 310-1	Index of Administrative Publications
DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders

5. Field Manuals (FM)

FM 5-5	Engineer Troops
FM 5-6	Operations of Engineer Troop Units
FM 5-15	Field Fortifications
FM 5-20	Camouflage, Basic Principles and Field Camouflage
FM 5-21	Camouflage of Fixed Installations
FM 5-25	Explosives and Demolitions
FM 5-34	Engineer Field Data
FM 5-35	Engineer's Reference and Logistical Data

FM 5-36	Route Reconnaissance and Classification
FM 5-132	Infantry Division, Engineer Battalion
FM 5-134	Armored Division, Engineer Battalion
FM 5-162	Engineer Construction Battalion and Group
FM 5-188	Engineer Topographic Units
FM 7-20	Infantry Battalion
FM 11-30	Signal Corps Technical Intelligence
FM 11-40	Signal Photography
FM 19-40	Handling Prisoners of War
FM 20-32	Employment of Land Mines
FM 20-100	Army Aviation
FM 21-5	Military Training
FM 21-6	Techniques of Military Instruction
FM 21-10	Military Sanitation
FM 21-11	First Aid for Soldiers
FM 21-26	Map Reading
FM 21-30	Military Symbols
FM 21-31	Topographic Symbols
FM 21-75	Combat Training of the Individual Soldier and Patrolling
FM 27-10	Laws of Land Warfare
FM 30-5	Combat Intelligence
FM 30-7	Combat Intelligence: Combat Group, Combat Command, and Smaller Units
(C) FM 30-16	Technical Intelligence (U)
FM 30-19	Order of Battle Intelligence
FM 30-28	Armed Forces Censorship (Army)
(C) FM 31-5	Landing Operations on Hostile Shores (U)
FM 31-25	Desert Operations
FM 31-50	Combat in Fortified Areas and Towns
(O) FM 31-60	River-Crossing Operations
FM 31-70	Basic Cold Weather Manual
FM 31-71	Northern Operations
(O) FM 33-5	Psychological Warfare Operations
FM 41-5	Joint Manual of Civil Affairs/Military Govern- ment
FM 41-10	Civil Affairs Military Government Operations
FM 41-15	Civil Affairs Military Government Units
FM 57-20	Airborne Techniques for Divisional Units
FM 57-30	Airborne Operations
FM 60-5	Amphibious Operations; Battalion in Assault Landings

(C) FM 60-10	Amphibious Operations; Regiment in Assault Landings (U)
(O) FM 100-5	Field Service Regulations; Operations
(O) FM 100-10	Field Service Regulations; Administration
FM 100-15	Field Service Regulations; Larger Units
(O) FM 101-5	Staff Officers' Field Manual; Staff Organization and Procedure
FM 101-10	Organizational, Technical, and Logistical Data

6. Technical Manuals (TM)

TM 5-220	Passage of Obstacles Other Than Mine Fields
TM 5-223	Foreign Mine Warfare Equipment
TM 5-231	Mapping Functions of the Corps of Engineers
TM 5-240	A Guide to the Compilation and Revision of Maps
TM 5-244	Multiplex Mapping
TM 5-245	Map Reproduction
TM 5-248	Foreign Maps
TM 5-250	Roads and Airfields
TM 5-252	Use of Road and Airfield Construction Equipment
TM 5-295	Military Water Supply
TM 5-541	Control of Soils in Military Construction
TM 5-545	Geology, and its Military Applications
TM 11-401	Elements of Signal Photography
TM 11-404	Photographic Darkroom Equipment
(O) TM 30-245	Photographic Interpretation Handbook
TM 30-246	Tactical Interpretation of Air Photos

7. Graphic Training Aids (GTA)

GTA 5-10-1	Fixed Bridge Card
GTA 5-10-2	Floating Bridge Card
GTA 5-14	Demolition Card
GTA 5-19	Land Mines and Fuzes, General
GTA 5-20	U. S. Land Mines, Fuzes and Boobytraps
GTA 5-22	British Land Mines, Fuzes and Boobytraps
GTA 5-25	Soviet Land Mines, Fuzes and Boobytraps
GTA 5-26	North Korean, Chinese Communist, and Soviet Satellite Land Mines, Fuzes and Boobytraps

8. Film Bulletins (FB)

FB 5-138	German S Mine
FB 5-140	Italian Mines

FB 5-186	Japanese Land Mines
FB 5-199	German Land Mines

9. Film Strips (FS)

FS 5-54	Bridge Reconnaissance
FS 5-55	Road Reconnaissance
FS 5-68	Japanese Mines
FS 5-134	Russian Mines and Igniters—Individual Mechanisms and Disarming Procedure
FS 6-61	Panoramic Sketching

10. Training Films (TF)

TF 5-1676	Basic Engineer Reconnaissance
TF 5-1790	Basic Map Reading—Part IV: Direction, Orientation and Location w/o Compass
TF 5-1792	Basic Map Reading—Part V: Photos and Photomaps
TF 7-1972	Terrain Analysis

APPENDIX II

SAMPLE ENGINEER INTELLIGENCE PERIODIC REPORT

(CLASSIFICATION)

319th Engr Bn
CHONJU, KOREA (CS 106344)
121900 Feb 1951

ENGINEER INTELLIGENCE PERIODIC REPORT NO. 106
Period Covered: 111800 to 121800 Feb 1951
Map: KOREA, 1:50,000 6329 I and IV

* * * * *

Par. ____ INTELLIGENCE ACTIVITIES FOR THE PERIOD

a. Road reconnaissance conducted in area. Reconnaissance overlay attached as inclosure ____.

b. Enemy AP minefields encountered at CS 121651 and CS 119321. Standard patterns used.

c. New type nonmetallic AP mine discovered in minefields at CS 121654 on 121535 Feb 1951. Mine transmitted to Lt. Jones of 533d ETID.

d. Roads swept for mines in division zone. Mine clearance overlay attached as inclosure ____.

e. Maps distributed during period:

1:50,000—850

1:250,000—250

Signature

Annexes:

Distribution:

Authentication:

(CLASSIFICATION)

APPENDIX III

SAMPLE ENGINEER INTELLIGENCE ANNEX

(CLASSIFICATION)

Copy No. 1
319th Engr Bn
APO 416 US Army
021200 Feb 1951
Message reference number 7

Annex B (Engineer Intelligence) to OpnO 7

References: Map, KOREA, 1:250,000, SEOUL Sheet (NJ 52-9)

1. Purpose

This study covers the possible crossing sites on the HAN RIVER within the division boundaries. The area considered extends along the HAN RIVER from the 40th to the 55th vertical grid line.

2. General Description of Area

a. Weather. The weather during the month of February is generally cold and clear. Temperatures are always below freezing at night, but may rise above freezing in the daytime. Precipitation is rare, and cloud cover is rarely over 25 percent. Sufficient moonlight for good visibility can be expected from 15 February to 23 February. (See inclosed sun and moon table.)

b. General Terrain. The terrain limits the choice of crossing sites. Between the 44th and the 48th vertical grid line and from the 52d vertical grid line to the division right boundary, mountains border the river and render it inaccessible to anything but foot troops. Elsewhere, wide river valleys open onto the HAN VALLEY from the south. These valleys are low and flat and generally covered with rice paddies. At this season, they are sufficiently frozen to support tracked vehicles. Three usable roads approach the HAN RIVER from the south. A two-lane all-weather road runs along the north bank of the river and a one-lane dry-weather road runs up the PUKHAN VALLEY. (See overlay for road network.)

(CLASSIFICATION)

(CLASSIFICATION)

c. *HAN RIVER*. The HAN RIVER fluctuates greatly in flow with the seasons. At this season it is at its low point, varying from 600 to 900 feet in width within the division sector. Except where it runs between mountains, it has a wide, sandy bed. The trace of the bed is sinuous, with cut banks on the concave sides of the bends varying from 6 to 15 feet in height. A thin sheet of ice forms out from the banks nightly, but melts during the day. It should pose no difficulty to a crossing.

3. Description of Crossing Sites

Three possible sites have been selected in the division area. They are discussed below as to tactical desirability, bank conditions, and stream conditions.

a. *Crossing Site at CS 4952.*

- (1) This site has several tactical advantages. It is on a salient projecting into our lines. Two fair roads approach the site from the south. On the north bank there is direct access to a main road. Cover and concealment are available behind the town of PUNWON-NI.
- (2) The south bank is a cut bank about 15 feet high. From it, an easily widened path leads down to the river. The north bank is a wide, gently sloping gravel beach. Roads can easily be constructed to join the existing road network.
- (3) The river varies in width here from 600 feet to 800 feet. (See overlay.) Its maximum depth is 9 feet. The current averages 4 feet per second.

b. *Crossing Site at CS 5254.*

- (1) This site is generally unfavorable tactically. It is on a salient toward the enemy. It requires a long approach over open terrain from PUNWON-NI.
- (2) The south bank is a wide, gradually sloping sand and gravel beach. Roads can easily be constructed across this area. The north bank is a cut bank about 10 feet high. At present, a narrow road descends from the bank to the river. It could easily be widened.
- (3) The river here averages 600 feet in width, with a current of 3 to 4 feet per second. By utilizing the island, a cross-water span of only 450 feet is required. However, the currents around the island are 5 to 6 feet per second.

(CLASSIFICATION)

(CLASSIFICATION)

- (4) A tank ford may exist at this site, approximately in line with the island. (See overlay.)

c. Crossing Site CS 4359.

- (1) The site is generally unfavorable tactically. It is on a salient toward the enemy. It requires an approach of several miles, over open terrain, from covered assembly areas. However, once the crossing is accomplished, our forces will be in open terrain and on a good road network.
- (2) The south bank is very wide and covered with loose sand. It is easily traversed by tracked vehicles, but wheeled vehicles will have difficulty. The north bank is a cut bank from 10 to 15 feet high. There is a narrow beach at water level on which vehicles could land. Considerable engineer work would be required to cut a road to the top of the bank.
- (3) At present, water flows only to the north of the island. (See overlay.) The river here is approximately 500 feet wide, with a current of 3 to 4 feet per second, and is unfordable.

4. Additional Factors

a. A rain or sudden thaw would greatly increase the width, depth, and velocity of the river. While not likely during February, it is possible. Thawing can be expected in March.

b. A dam on the PUKHAN RIVER at CS 6276 controls a reservoir which is nearly full. If this dam were blown, or its gates suddenly opened, it would greatly increase the flow in the HAN RIVER below its junction with the PUKHAN.

c. Both the road and railroad bridges across the PUKHAN RIVER have been destroyed. (See overlay.)

DILLARD

Lt Col

Appendixes: 1—Sun and moon table

2—Overlay

Distribution: A

OFFICIAL:

/s/ Ross

ROSS

S2

(CLASSIFICATION)

APPENDIX IV
SAMPLE INTELLIGENCE REPORT ON ENEMY MATERIEL

(CLASSIFICATION)

537th ENGINEER DETACHMENT (TECHNICAL INTELLIGENCE) (COLLECTION)

APO 23

18 June 1953

Report No. 10

SUBJECT: Chinese Antipersonnel Concrete Ball Mine

TO: The Engineer

IX Corps

APO 50

ATTN: 555th ED (TI) (R)

1. Introduction

a. Three Chinese antipersonnel concrete ball mines (*Transliteration: San-ho-tu chin-chuang ti-lei*) (incl. 1), were found in a ditch near *Koa-San* (CD5678, Korean Map Series 0-235, sheet No. KL), on 12 June 1953, by members of Company B, 133d Engineer Combat Battalion, and were turned over to this organization (13 June 1953) by the S2 (Lt. John R. Smith) of that Engineer battalion. He stated that the mines were discovered and evacuated while the members of Company B were on a routine reconnaissance. The mines had been lying in the ditch without any special employment, as if the enemy had merely thrown them there.

b. The members of Company B were not contacted for questioning, since the S2 officer was present in the ditch when the mines were removed. The information of the S2 is evaluated as B2.

c. The Chinese nomenclature given above was taken from a report on a POW interrogation submitted by this organization as Report No. 6, dated 20 May 1953.

2. Research

No specialized research was required in the preparation of this report.

(CLASSIFICATION)

(CLASSIFICATION)

3. Description

a. The concrete ball mine (incl. 1) is 10 inches in diameter and weighs approximately 20 pounds, including the fuse assembly, the main charge (two 400-gram blocks of TNT), and the concrete case. The unpainted, spherical case consists of cement, sand, gravel, and fragments of metal.

b. The fuse assembly (incl. 2) consists of a Chinese fuse lighter model 29, 2 inches of Chinese P. K. time fuse, an adapter (unidentified) for connecting the fuse to the lighter, a detonator holder (unidentified), and a Soviet MX No. 8 detonator. These items are similar to those of which a description and sketch were given in Report No. 4, submitted by this organization 19 April 1953. The fuse requires 10 seconds to burn through. The fuse assembly is fixed and positioned in the center of the mine by wooden blocks (inclosure 3) and wedges.

c. The main charge, shown in the cross-sectional view, inclosure 2, consists of two standard 400-gram blocks of Soviet TNT, as described and shown on page 250, TM 5-2232.

d. After the main charge has been placed in the mine, as shown in incl. 1, the fuse assembly is inserted by screwing the detonator holder into the threaded detonator well of one of the 400-gram explosive blocks. Two wooden blocks (incl. 3) are placed around the fuse assembly and forced down into the 2- by 3-inch hole in the top of the mine. Two small wooden wedges are forced down between the large sectional blocks and the fuse lighter. A trip wire, or a wire controlled by the enemy, may be attached to the pull ring to actuate the fuse lighter. After a 10-second delay, caused by the burning of the time fuse, the detonator explodes the 800 grams of TNT, showering fragments of concrete, stone, and metal in all directions.

e. An investigation of the three fuse assemblies of the mines revealed that in each case weather had affected the time fuse. Water had collected in the hole of the concrete case, wetting the time fuse, which would not burn, until it had been dried. However, the water apparently had no effect on the fuse lighter and main charge.

4. Field Tests

Because only three Chinese ball mines were found, no field tests

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were made to determine the possible danger radius of this type of mine.

5. Use

a. Methods of employing the Chinese antipersonnel concrete ball mine are not known; but it is apparent that detonation will be accomplished either by a trip wire or by enemy personnel using a pull wire.

b. The 9th Chinese Infantry Division was the enemy organization which had occupied the area before the mines were captured. Since the 8th Chinese Engineer Battalion is the organic engineer unit of that division, it is presumed that the 8th Engineers used the mines. No other mines of this type have been encountered by this intelligence collection unit.

6. Countermeasures

To neutralize this mine the following steps are recommended:

a. Check both ends of the trip wire for boobytraps, and check the control wire for possible enemy personnel.

b. Cut trip wire.

c. Remove wedges.

d. Lift out wooden blocks.

e. Lift out fuse assembly and attached explosive.

f. Unscrew detonator holder from explosive block.

g. Remove detonator from holder.

7. Production

a. There were no markings to identify the manufacturer.

b. It was obvious from visual inspection that the cases of the three concrete mines were formed in the same wooden mold. Markings left by the mold show impressions of a wood-gouging tool which were identical on the surfaces of all three mines.

8. Conclusions

It is the opinion of the undersigned that—

a. The Chinese ball mine was designed to be employed as a controlled antipersonnel mine.

b. When so employed, and actuated by a trip wire or pull wire, the mine would be relatively ineffectual against troops, as there

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would be a 10-second delay after it was actuated. A person hearing the "pop-and-fizzing" noise made by the fuse lighter and time fuse being actuated would have time enough to drop to the ground or to seek cover, thus minimizing the effect of the mine. If and when an instantaneous type of fuse assembly is employed, the mine will be much more effective.

c. The present mine warfare training program teaches procedures for safely neutralizing the mine.

d. Since the U. S. Army does not have any mine similar to the one reported on herein, no field comparison can be made of similar types.

9. Disposition

The Chinese ball mines and their complete contents, including the fuse lighter, detonators, and explosive blocks, have been crated and are being forwarded (19 June 1953), via III Corps liaison plane, to the 332 ED (TI) (R) at *Tai-Saeng*; ETA IX Corps Airfield at 1600 hrs 19 June 1953.

3 Inclosures: (Omitted)

Alan G. Aubrey
/s/ ALAN G. AUBREY
1st Lt CE
COMMANDING

(CLASSIFICATION)

APPENDIX V

ABBREVIATIONS

(In addition to those authorized in AR 320-50)

ED (TI) (C)	Engineer Detachment (Technical Intelligence) (Collection) Same as ETID (C)
ED (TI) (R)	Engineer Detachment (Technical Intelligence) (Research) Same as ETID (R)
EIG	Engineer Intelligence Guide
EIN	Engineer Intelligence Notes
EIS	Engineer Intelligence Study
ETD	Engineer Terrain Detachment
ETID (C)	Engineer Technical Intelligence Detachment (Collection) Same as ED (TI) (C)
ETID (R)	Engineer Technical Intelligence Detachment (Research) Same as ED (TI) (R)
IAC	Intelligence Advisory Committee
ID	Intelligence Division (in Office, Chief of Engineers)
JIC	Joint Intelligence Committee
JIG	Joint Intelligence Group
MII	Military Intelligence Interpreter
MIT	Military Intelligence Translator
NIS	National Intelligence Survey
PI	Photo Interpreter, Photo Interpretation
PIC	Photo Interpretation Center
Prce	Process, Processing
Recon	Reconnaissance, Reconnoiter
SES	Special Engineering Study
Topo	Topographic, Topography

INDEX

	Paragraphs	Pages
ACSI. (<i>See</i> Assistant Chief of Staff for Intelligence.)		
Aerial photo coverage	29	30
Agency of information, definition	40	38
Airborne division	18	15
Aircraft, reconnaissance, organic	28	28
Airfields	65, 94, 113	58, 76, 90
Airhead, seizure of	74	61
Air raid shelters	113	90
Air Weather Service	26	21
Armored division	18	15
Army engineer	16, 25	14, 20
Army topographic battalion	17	15
Assistant Chief of Staff for Intelligence	9, 12	8, 10
Avenues of approach	58, 74	52, 61
Barriers and obstructions, natural	58, 74	52, 61
Beaches	58, 82	52, 67
Board of engineers for rivers and harbors	11	9
Bridge reconnaissance	27	22
Bridges	27, 65, 74, 90, 92	22, 58, 68, 72, 74
Buildings	66, 99, 113	59, 81, 90
Cableways	96	79
Camouflage	85	70
Canals	64, 88	58, 71
Caves	92	74
Channels, intelligence	8, 12, 44	6, 10, 42
Chief of Engineers	24, 31, 73, 75, 121	20, 32, 61, 65, 98
Channels to theater of operations	44, 46	42, 45
Intelligence products	54, 55, 56	51, 52
Intelligence responsibilities	9, 10, 11, 12, 13	8, 9, 10
CIA. (<i>See</i> Counter Intelligence Agency.)		
CIC. (<i>See</i> Counter Intelligence Corps.)		
Civil affairs military government	66	59
Civil affairs military government units	30	32
Civil defense	116	94
Civilian engineer organizations	118	95
Climate	58, 64, 87	52, 58, 71

	Paragraphs	Pages
Coal.....	67, 110	59, 89
Coastal areas.....	82, 114	67, 91
Collection plan for engineer information.....	10, 16-21, 23-33, 48-52	8, 14, 19, 46
Collection plan for engineer information.....	51	48
Communication, lines of.....	65, 89-96	58, 72
Communication zone engineer.....	15	12
Concealment.....	58, 64, 74, 85	52, 58, 61, 70
Construction.....	60, 67, 83, 85, 103, 107, 113	56, 59, 69, 70, 86, 88, 90
Corps engineer.....	17	15
Counter Intelligence Agency.....	13	10
Counter Intelligence Corps.....	30	32
Cover.....	58, 64, 74	52, 58, 61
Cultural features.....	66, 97-104	59, 80
Dams.....	92, 101, 113	78, 84, 90
Defense, Department of.....	6, 57	4, 52
Defenses.....	72, 74, 114	61, 91
Defensive doctrines.....	114	91
Direction of information collection effort.....	48-52	46
Displays.....	45, 61	44, 56
Dissemination of engineer intelligence.....	15, 18, 21, 23, 42-47	12, 15, 17, 19, 41
Division engineer.....	18, 25	15, 20
Divisional engineer battalion.....	18, 21, 51	15, 17, 48
Document section.....	26	21
Documents, collection of information form.....	25, 26, 31	20, 21, 32
Drop zones.....	74	61
Dust storms.....	83, 87	69, 71
Earthquakes.....	64, 88	58, 71
ED (TI) (C). (See Engineer detachment (technical intelligence) (collection).)		
ED (TI) (R). (See Engineer detachment (technical intelligence) (research).)		
EEI. (See Essential elements of information.)		
EIG. (See Engineer Intelligence Guides.)		
EIN. (See Engineer Intelligence Notes.)		
EIS. (See Engineer Intelligence Studies.)		
Engineer base survey company.....	28	28
Engineer base topographic battalion.....	15, 28	12, 28
Engineer combat battalion, army.....	21, 28	17, 28
Engineer combat group.....	21, 28	17, 28

Engineer detachment (technical intelligence) (collection.).		
(See Engineer technical intelligence detachment (collection).)		
Engineer detachment (technical intelligence) (research).		
(See Engineer technical intelligence detachment (research).)		
Engineer information. (See Information, engineer.)		
Engineer intelligence. (See Intelligence, engineer.)		
Engineer intelligence files-----	34, 38	35, 38
Engineer Intelligence Guides-----	55	51
Engineer intelligence journal-----	34, 35	35
Engineer Intelligence Notes-----	56	52
Engineer intelligence situation map-----	34, 37	35, 36
Engineer Intelligence Studies-----	54	51
Engineer intelligence work sheet-----	34, 36	35
Engineer map depot platoon-----	16	14
Enginee materiel. (See Materiel, engineer.)		
Engineer School, The-----	127	105
Engineer Strategic Intelligence Division-----	11	9
Engineer technical intelligence detachment (collection)-----	17, 18, 20, 32, 44-46, 122, 123, 125	15, 16, 33, 42, 99, 104
Engineer technical intelligence detachment (research)-----	16, 17, 32, 44-46, 122, 123, 125	14, 15, 33, 42, 99, 104
Engineer terrain detachment-----	16, 17, 20, 44, 46, 122, 124, 125	14, 15, 16, 42, 45, 99, 102, 104
Engineer topographic battalion, army-----	28	28
Engineer topographic company, corps-----	17	15
Engineer topographic group-----	28	28
Engineer topographic troop units-----	15, 17, 19, 28	12, 15, 16, 28
Engineer troops, intelligence regarding-----	74, 116-120	61, 94
ESID. (See Engineer Strategic Intelligence Division.)		
Essential elements of information, engineer-----	49-51, 74, 78	46, 61, 66
Estuaries-----	82	61
ETD. (See Engineer terrain detachment.)		
ETID (C). (See Engineer technical intelligence detachment (collection).)		
ETID (R). (See Engineer technical intelligence detachment (research).)		
Ferries-----	74, 96	61, 79
Fields of fire-----	58, 74	52, 61
Field operations intelligence unit-----	26	21
Files, engineer intelligence-----	34, 38	35, 38
Fire protection-----	100, 113	81, 90
Flood control works-----	101, 113	84, 90
Flood walls-----	101	84
Floods-----	64, 74, 101	58, 61, 84

	Paragraphs	Pages
FOI unit. (<i>See</i> Field operations intelligence unit.)		
Fortifications	72, 74, 114	61, 91
Fords	82	67
G2, army	16, 28, 29, 44	14, 28, 30, 42
G2, corps	28	28
G2, divisional	21, 28, 121	17, 28, 98
G2, theater army	14, 15	12
Garbage disposal	66, 100	59, 81
Gas, illuminating	66, 100	69, 81
Geographic features, natural	64, 79-88	58, 67
Geological data	84	70
Geological Survey. (<i>See</i> U. S. Geological Survey.)		
Geology	18	15
Gravel. (<i>See</i> Sand and gravel.)		
Ground water	82	67
Harbors	82, 92, 95	67, 74, 79
Hydrography and hydrology	20, 58, 64, 65, 82, 92	16, 52, 58, 67, 74
Hydraulic structures	100, 101, 113	81, 84, 90
Ice conditions	74, 82	61, 67
Icing	82	67
Industrial facilities	67, 105-111	59, 88
Infantry division	18	15
Information:		
Accuracy of	40	38
Agency of, definition	40	38
Credibility of	40	38
Information, engineer:		
Basic elements of	77-121	66
Collection of. (<i>See</i> Collection.)		
Definition	4	4
Direction of collection effort	48-52	46
Evaluation of	40	38
Interpretation of	41	40
Processing of. (<i>See</i> Processing.)		
Reporting of	33	34
Information, source of, definition	40	38
Intelligence annex, engineer	62, App. III	57, 112
Intelligence channel in a theater	44	42
Intelligence, combat	6	4
Intelligence cycle	23	19
Intelligence discipline	31	32
Intelligence Division:		
OCE	10	8
Office of theater army engineer	15	12
Information, engineer:		
Applications of	69-76	60

	Paragraphs	Pages
Information, engineer—Continued		
Categories of.....	63-68	58
Definition.....	5	4
Dissemination of. (<i>See</i> Dissemination.)		
For future needs.....	75	65
Nature.....	6, 63-68	4, 58
Production of. (<i>See</i> Production.)		
Products of.....	53-62	51
Relation to other intelligence.....	7	5
Routine reports.....	62, Apps. II, III	57, 111, 112
Time element.....	76	65
Intelligence estimate, engineer.....	62	57
Intelligence officer. (<i>See also</i> G2 and S2.).....	8, 26, 29-31, 33, 44, 50, 51	6, 21, 30, 34, 42, 47, 48
Intelligence periodic report, engineer.....	62, App. II	57, 111
Intelligence personnel, U. S. engineer.....	19, 20, 122-128	16, 99
Intelligence section, divisional engineer battalion.....	18, 127	15, 105
Intelligence, strategic.....	6, 57, 121	4, 52, 98
Intelligence subsection, office of army engineer.....	16	14
Intelligence summary, engineer.....	62	57
Intelligence training. (<i>See</i> Training.)		
Interpreter/translator section.....	26	21
Interrogators of prisoners of war section.....	26	21
IPW section. (<i>See</i> Interrogators of prisoners of war section.)		
Irrigation projects.....	113	90
J2, theater.....	14, 15	12
JIG. (<i>See</i> Joint Intelligence Group.)		
Joint Intelligence Group.....	13	10
Journal, Engineer Intelligence.....	34, 35	35
Labor.....	113-115	90
Lakes.....	82, 92	67, 74
Landforms. (<i>See also</i> Geographic features, natural.).....	58, 74, 81	52, 61, 67
Land use.....	64, 86	58, 70
Landing beaches. (<i>See</i> Beaches.)		
Landing fields.....	74, 94	61, 76
Levees.....	101	84
Lignite.....	110	89
Lines of communication.....	58, 65, 89-96	52, 58, 72
Locks.....	92, 101	74, 84
Logistical planning and operations.....	6, 71	4, 60
Logistics, engineer, intelligence on.....	68, 119	59, 96
Lumbering.....	85	70
Manufacturing and processing.....	108	88
Mapping.....	9, 15, 16	8, 12, 14

	Paragraphs	Pages
Mapping, intelligence regarding-----	60, 118	56, 95
Maps-----	25, 45,	20, 44,
	47	45
Marshes-----	82	67
Materiel, engineer-----	4, 20,	3, 16,
	25, 32,	20, 33,
	45, 46,	44, 45,
	59, 67,	55, 59,
	68, 73,	61, 92,
	115, App. IV	115
Military factors-----	68, 112-121	59, 90
Military construction-----	113	90
Military installations-----	114	91
Mineralogical data-----	84	70
Mining operations-----	66, 102,	59, 86,
	110	89
Moraines-----	83	69
National Intelligence Survey-----	57	52
Navigation-----	82, 92	67, 74
NIS. (See National Intelligence Survey.)		
Nuclear weapons and effects-----	6, 83,	4, 69,
	85, 87,	70, 71,
	89-95, 98-103,	72, 80,
	109 114,	88, 91,
	117, 118	95
OB section, (See Order of battle section.)		
Observation-----	58, 74	52, 61
Obstacles-----	58, 74	52, 61
Oceanography-----	82	67
Operations, engineer-----	68, 117	59, 95
Order of battle-----	60	56
Order of battle section-----	26	21
Organization, engineer-----	68, 118	59, 95
Paramilitary engineer organizations-----	118	95
Peat-----	110	89
Permafrost-----	82	67
Personalities-----	60, 68,	56, 59,
	118, 120	95, 97
Petroleum products-----	67, 102,	59, 86,
	109	88
Photographs, aerial-----	25, 28	20, 28
Photographs, ground-----	25, 27	20, 22
Photo interpretation-----	29	30
Photointerpreter section-----	26	21
Pipelines-----	65, 93,	58, 75,
	109, 113	88, 90
PI section. (See Photointerpreter section.)		
Ponds-----	82	67
Ports-----	65, 92,	58, 74,
	93, 95,	75, 90
	113	

	Paragraphs	Pages
Population, enemy-----	121	98
Power, electric-----	58, 66, 100, 106	52, 59, 81, 88
Precipitation-----	87	71
Prisoners of war-----	25, 30	20, 32
Processing of engineer information-----	18, 20, 23, 34-41	15, 16, 19, 35
Production of engineer intelligence. (<i>See also</i> Processing of engineer information.).	11, 15, 16, 21-52	9, 12, 14, 17
Products of engineer intelligence-----	53-62	51
Quarries-----	66, 84, 103	59, 70, 86
Radio systems-----	66, 100	59, 81
Railroads-----	6, 7, 65, 91, 113	4, 5, 58, 73, 90
Reconnaissance, aerial-----	25, 28, 29	20, 28, 30
Reconnaissance, ground-----	25, 27	20, 22
Refugees-----	25, 26, 30	20, 21, 32
Research and development-----	4, 73, 113, 115	4, 61, 90, 92
River crossing, tactical-----	74	61
Rivers-----	64, 74, 82, 92	58, 61, 67, 74
Roads-----	65, 74, 89, 113	58, 61, 72, 90
Rock-----	84, 103	70, 86
S2, engineer battalion-----	18, 51, 127	15, 48, 105
S2, engineer group-----	21, 44	17, 42
S2's of divisional units-----	28	21
Sand and gravel-----	66, 83, 103	59, 69, 86
Seaports. (<i>See</i> Ports.)		
SES. (<i>See</i> Special Engineering Studies.)		
Sewage disposal-----	66, 100	59, 81
Situation map, engineer intelligence-----	34, 37	35, 36
Soils-----	74, 83	61, 69
Source of information, definition-----	40	38
Special Engineering Studies-----	54	51
Springs-----	82	67
Strategic intelligence-----	6, 57, 121	4, 52, 98
Strategic planning-----	6, 70	4, 60
Supply. (<i>See</i> Logistics.)		
Surf conditions-----	82	67
Swamps-----	82	67
Tactical planning and operations-----	72	61
Target locations, record of-----	34, 39	35, 38

	Paragraphs	Pages
Team IG. (<i>See</i> Engineer technical intelligence detachment (collection).)		
Team IH. (<i>See</i> Engineer technical intelligence detachment (research).)		
Team IJ.....	16	14
Team IK. (<i>See</i> Engineer terrain detachment.)		
Team IL.....	16	14
Technical personnel.....	120	97
Telegraph systems.....	100	81
Telephone systems.....	100	81
Temperatures.....	87	71
Terrain models.....	45, 74	42, 61
Terrain studies. (<i>See also</i> Geographic features, natural.)	11, 20,	9, 16,
	58, 70,	52, 60,
	72	61
Theater army engineer.....	14, 15,	12, 56
	61	
Theater engineer.....	25	20
Tidal data.....	82	67
Topography. (<i>See</i> Geographic features, natural.)		
Trafficability.....	58, 64,	52, 58,
	74, 82,	61, 67,
	83	69
Training, engineer, intelligence regarding.....	68, 116	59, 94
Training, intelligence, of U. S. engineer personnel.....	123-128	99
Tramways.....	96	79
Transportation.....	65, 70-72,	58, 60,
	74, 89-96	61, 72
Transportation Corps.....	7, 13,	5, 10,
	91, 92	73, 74
Transportation systems, public.....	66, 100	59, 81
Transportation, water.....	65, 82	58, 67
Trash and garbage disposal.....	66, 100	59, 81
U. S. Air Force.....	28, 29	28, 30
U. S. Geological Survey.....	11	9
Underground installations.....	113	90
Urban areas.....	66, 98	59, 80
Utilities.....	66, 95,	59, 77,
	100, 113	81, 90
Vegetation.....	64, 85	58, 70
Volcanoes.....	64, 88	58, 71
Water points.....	58, 74	52, 61
Water supply.....	58, 64,	52, 58,
	66, 71,	59, 60,
	74, 82,	61, 67,
	100	81
Waterways.....	65, 82,	58, 67,
	92, 113	74, 90
Weather.....	58, 64,	52, 58,
	70, 74,	60, 61,
	87	71

	Paragraphs	Pages
Wells-----	82	67
Who's who, engineer. (<i>See Personalities.</i>)		
Winds-----	74, 87, 94, 95	61, 71, 76, 77
Work sheets, engineer intelligence-----	34, 36	35

[AG 353 (8 Jan 59)]

By Order of *Wilber M. Brucker*, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

Official:

R. V. LEE,
Major General, United States Army,
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NG: State AG (3); units—same as Active Army except allowance is one copy to each unit.

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For explanation of abbreviations used, see AR 320-50.